

A
RECOVERY PLAN FOR BENGAL

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Message.

R

Uttarāy
Santiniketan, Bengal
Oct. 3, 1934

My dear Satish Chandra

your book, *A Recovery plan* for Bengal, has come as a unique gift to our young generation who are struggling not only against their poverty that cripples them in their race of life, but more so against the consciousness of their own inefficiency produced by ignorance and exaggerated fear of risk. The guidance which you have offered to them in your book is not through mere advice empty of facts, but solid impressions most of which can be turned into practical use even by men of limited means not possessing any impossibly high standards of skill. You have truly earned the blessings of your countrymen for showing them the true path of economic salvation and heartening them in their desperate effort to survive the cruel pressure of privation.

yours affectionately

Rabindranath Tagore

Appreciation.

"Uttarajan"
Santiniketan, Bengal

October 3, 1934.

At a certain period of my life I was in close association with some villages in Bengal when I came to realise that the only productive factor in our province almost entirely consisted of cultivators. We who occupy the various upper strata of society are directly or indirectly dependent for our maintenance upon those patient toilers of the soil. And yet the educated community in Bengal have for long remained blissfully oblivious of the fact that agriculture as the sole basis of the nation's livelihood cannot but be meagre and uncertain in its boon.

Once Bengal had the reputation of being rich; this she did not owe merely to the fertility of her soil, but to other channels of wealth branching out in villages that for ages lavishly supplied needs of the foreign market. Since these have been lost to us like the net work of our waterways silted up and choked by weeds, our villages are driven to desolation and to the living death worse than death itself. The educated minority had their eyes fixed staring at the vision of the lean and fat wages haunting some occasional vacant seats in the lower and upper flats of the government office. This mentality sought its natural outlet in the politics of the mendicant and ignored the fundamental necessity of the people who had grown inconspicuous by the deadly pallor of their anaemic existence.

Now when in course of time the number of claimants has grown too large and the elasticity of the available government service has been strained almost to its extreme margin, our bhadralogues suddenly have come to realise the enormous gaps in the provision for material needs of the nation. They are just beginning to feel the eagerness actively to produce wealth and not to run after the precarious livelihood of a parasite. But the very urgency of their necessity itself has made them painfully aware of their helplessness. They have come to know that their education representing an undigested medley of underlined passages from text books is utterly of no avail in their dreary lack of prospect



ayan
Santiniketan, Bengal

which keeps their life closed in blankness. At such a crisis it only aggravates their weakness when vague advice and exhortation to open out unaccustomed paths of economic salvation is tiresomely dinned into their ears. Their problem is not that they are unconscious of their situation but that their timidity born of inexperience firmly holds them back from all strenuous experiment and enterprise. At such a time of desperation the best possible book one can wish for has appeared bearing the suggestive title "A Recovery Plan of Bengal." The author, Mr. S. C. Mitter has taken immense trouble in gathering detailed information about all departments of industries that can be adopted by our countrymen of all grades of endowment. It is sure to be an inspiration to our youngmen and a valuable guidance for them. I offer my best thanks to the author on behalf of my countrymen and personally of myself for the suggestions that will be of fruitful help for the village work I am carrying on in connection with Santiniketan.

Rabindranath Tagore



Calcutta, Oct 5 1934.

Mr. S. C. Mitter's "Book" "A Recovery
Plan for Bengal" has not come a moment
too soon. In fact, it has appeared at
most opportune and psychological moment
our youngmen are being broken from
pillar to post and from post to pillar in the
matter bearing their bread. But they
do not know what to do and how to
proceed. Mr. Mitter is a patriot and
full of enterprise and what is more, with
his unique opportunity for coming in
contact with the different sides of our
economic problems has become thoroughly
conversant with the subject he treats.

He has shown ~~how~~ in many
how in many cases ^{even} with small capital
our youngmen can earn their livelihood
and in course of time rise to an eminent
position in business.

He has also shown
what a vast field of ^{fruits} patriotic
and useful work - work without which
no country can become great - lies before
them. It will not do merely to turn to
the Government for any substantial help
in every sphere of our constructive activity.
It is therefore, all the more necessary for
young men to trust to their own initia-
tive and resources. Mr. Mitter has shown
the way how to solve the problem of

Briefing about the economic
regeneration of our Province. I commend
his book to the serious attention of our
countrymen. And I hope every one
interested in the well-being of this
land will read and deeply ponder
over what he has said in it.

P. C. Ray

FOREWORD.

This book embodies the results of labour undertaken with a view to explore the avenues of the economic development of the Province and make its teeming millions happy and contented. I am grateful to the Hon'ble Nawab K. G. M. Farouqi for not only inspiring me but also actively assisting and even guiding me in the various stages of the preparation of this volume. To H. E. Sir John Anderson, we, in Bengal, are deeply indebted for his noble desire, great determination, perhaps unparalleled in India so far as Administrators are concerned, for making a real and sincere effort in developing the economic resources of the country.

Every country and every province are now seeking to improve their economic condition. Agreements are being concluded and Plans prepared.

Abraham Lincoln once said :

“I do not know much about the Tariff ; but I do know this much, when we buy goods abroad, we get the goods and the foreigners get the money ; when we buy goods made at home we get both the goods and the money.”

With malice towards none, with charity for all, with fairness in the right as God gives us to see the right, we feel it our duty to develop the economic resources of the province, to give sustenance to the people first of all, and then adjust our economic relations with the other provinces and other countries—especially member countries of the Great Empire to which we belong.

The object of the book is to draw the attention of the Government and the people to the path along which we can progress towards the goal. If it serves that purpose, sets our young men and young women thinking and stems the tide of discontent which is taking us to destruction I shall consider

myself amply compensated for the labour I have bestowed on it.

To Dr. M. M. Roy, D.Sc., Ph.D., etc., I cannot but too strongly express my heart-felt gratitude for not only giving me valuable suggestions but also going through the entire work, by correcting proof-sheets, etc.

ACKNOWLEDGMENT.

• • ,

I need hardly state that this Book could not have been completed in the present form without help received from previous publications in various countries as also from friends who have taken a keen interest in it. I acknowledge my heartfelt gratitude to those who have worked before me in this Department and have mentioned their work in various places in the body of this Book. But I must mention the name of those but for whose ungrudging co-operation it would have been difficult for me to prepare the work within the time limit fixed upon by me. Among them Mr. H. P. Ghosh who unreservedly placed at my disposal his varied collection of books etc., Professor Saroj K. Basu of the Jagannath Intermediate College, Dacca and Dr. Promotho Dutt. To Mr. A. T. Weston and Mr. K. Ghosh, I am thankful for their advice during the printing stage of the book. Mr. Asutosh Bagchi, of the Calcutta University office has not only carefully gone through the proofs and attended to the technicalities of printing but also going through the original copy. They have shared and thus made light my labours and thank them on the completion of the work we had been engaged in.

To my readers, I shall be grateful for any suggestion or criticism they may kindly offer, which will help me to bring out a still more improved edition in future.

Before concluding I shall be failing in duty if I did not mention the name of Mr. Mahitosh Ray Choudhury for first suggesting me to undertake a work of this type years ago.

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*Von Brigadier Major
Cafarella. May 6, 1937*

A RECOVERY PLAN FOR BENGAL

CHAPTER I

INTRODUCTORY

The need for an economic planning

“Planned Economy” or “Economic Planning” has come to engage the attention of the civilised nations, ever since the last Great War. The post-war economic developments have brought about a complete breakdown of the old *laissez faire* policy which dominated the economic thought of the last century. In place of the old *laissez-faire* doctrine, an entirely new idea has seized successfully modern economic thought. This change which is sure to have a far-reaching and abiding effect on the economic future of the world was inevitable after the War had put the old order of things in the melting pot. The War was not a passing shower nor a spell of bad weather. It brought in its train a deluge, a convulsion of nature. It brought unheard-of changes in the social, the economic and the moral fabric of society and planted them there. In the words of Mr. Lloyd George it was a cyclone, tearing up by the roots the ornamental plants of modern society and wrecking some of the flimsy trestle-bridges of modern civilisation, an earthquake, one of those seismic disturbances in which nations leapt forward or fell backward by generations in a single bound.

It need hardly be said that the need for planning had its origin in the realisation by the belligerent countries, that without a thorough overhauling of their economic systems it was not possible for them to regain the position they had acquired in international trade and commerce before the War and the retention of which was vital to their very existence. The

policy adopted by these nations had its repercussions on the other countries as international commerce links together the various countries of the world and without this interlinking it can have no meaning. Yet another change had manifested itself during the long period of the War. It had created what may be called a system of indirect protection by obstructing the sources of foreign supply and had compelled countries to fall back upon their own resources which had not been utilised before. This resulted in many European countries being faced with the danger of a shrinking demand of their finished goods in the markets of the world which they had, so to say, captured with infinite toil. All these new factors had to be recognised and reckoned with, the inevitable result being a readjustment of their economic condition necessitating planned economy to avoid decay, disintegration and ultimate collapse.

The first country to realise this position and recognise the need for planned economy was Soviet Russia which launched a comprehensive plan of reconstruction after it had been converted into a mangled mass of misery by the War. Its plan has attracted the attention of the civilised world as a great experiment, perhaps the greatest ever attempted in reconstruction and development. It is called the "*Piatiletka*"—the Five Year Plan of building up a new industry and a new agricultural system, a gigantic effort to push through an industrial technical revolution in five years under entirely new methods of State control. The general opinion about this plan was clearly expressed thus by the American economist, Stuart Chase, after his return from a visit to the Soviet Union :

"Sixteen men in Moscow to-day are attempting one of the most audacious experiments in history. As the *presidium* of the State Planning Commission, responsible to the Council of People's Commissars, and popularly known as the Gosplan, they are laying down the industrial future of 146,000,000 people and of one-sixth of the land area of the world for fifteen years. They are making a careful and immensely detailed plan for

the next five years, and are blocking out the general economic development for the next fifteen years It is an experiment so immense, so novel and so courageous that no student of economics can afford to neglect it. Whether it transcends the limits of human administrative capacity and fails, or whether it meets this challenge and succeeds, it has much to teach us. 'It is something new in the world'.* •

In considering the Russian plan one must not overlook—far less ignore, the peculiar conditions from which it has drawn its sustenance. Russia had undergone a cataclysmic change in her political condition. She had not taken the path of evolution, but had come out of a red revolution which had destroyed her age-old institutions and trampled under its iron heels those traditions which tenderly entwine themselves round them. For examples of evolutionary economic planning we have to go to countries like Italy, Germany, the United Kingdom and the United States of America which have not been slow to adapt their systems to the new post-war conditions.

To-day when the world has been caught in the grip of a depression, unprecedented in history, and unemployment figures have risen beyond all comprehension, the necessity of "planned economy" has been more keenly felt than ever. The nations of the world, suffering from a common ill, met in an historic conference, the World Economic Conference in London in June, 1933. They sought to devise some means whereby they could pull themselves out of the acute economic crisis in which they were plunged. The main features of the crisis were vividly portrayed by Mr. Ramsay MacDonald in the speech in which he welcomed the delegates to the Conference. He pointed out how the world for some years had been suffering from an economic decline which had closed factories, restricted employment, reduced the standard of living, brought some States on the verge of bankruptcy resulting in

* Stuart Chase—*The New York Times*, dated 11th December, 1927.

attenuated revenue resources the handmaid of recurring deficit budgets. Prices had fallen well below the line at which production was remunerative ; and the general crisis had been accentuated by tariff restrictions and quotas, and exchange control had reduced international trade to 40 per cent. of its pre-depression volume and less in value.

It need hardly be said that India with her extensive foreign trade relations could not possibly hope to escape the ravages of this unprecedented depression. Indeed she has suffered worse than many other countries for the simple reason that she is mainly an agricultural country and the fall in the price of agricultural products has been sharper than the fall in the price of manufactured goods. The effect of the depression on India was thus described by the Hon'ble Finance Member, Government of India, in his speech when introducing the Budget proposals for 1934-35 in the Legislative Assembly :—

“I need hardly take time in describing the painfully well-known features of what has happened to the world since the end of 1929 when we entered into the severest period of economic disturbance and depression which our modern system has experienced, and during which all countries have been faced with insoluble difficulties and tasks of re-adjustment as regards their public finance. I will only deal briefly with a few salient facts. As a measure of India's difficulties I may remind the House that whereas in the 10 years ending March 31, 1930, the value of India's exports and re-exports of merchandise averaged just under 326 crores, in 1930-31 that fell to just under 226 crores, in 1931-32 to about 160 crores and in 1932-33 to 135½. Imports of merchandise though they did not fall quite in the same proportion as exports, owing to the well-known fact that private gold exports gave India a supplementary purchasing power, nevertheless fell very steeply from an average of 242 crores for the ten years ending March 31, 1930 to 163 crores in 1930-31, 125 crores in 1931-32 and 132 crores in 1932-33. In view of the extent to which we rely on customs

import duties for revenue, the effects of this enormous drop must be obvious. At the same time our other main source of tax revenue—income tax was heavily cut into. I may give one simple index of this fall. Taking the head of income assessable as 'profits' the annual profits of companies and registered firms in India which averaged over 53 crores in the eight years ending March 31, 1930 fell to under 29 crores in 1932-33. Simultaneously with the crumbling of the foundations of our tax revenue, there had been a heavy drop in non-tax revenue; Non-tax revenue, which in 1923-24 was Rs. 30½ crores, had fallen in 1929-30 to Rs. 19½ crores and for 1934-35 is down to Rs. 5¼ crores Lastly, we have had at the same time to face serious losses of customs import duties for reasons other than the economic depression, namely as a result of the operation of protective policies".

The economic fabric of Bengal has, perhaps, suffered more seriously than that of any other province of India, specially because of the slump in jute. The staple primary products in Bengal are jute and rice. "The prices of these articles are a fairly accurate barometer by which to measure the financial weather in Bengal, indicating as they do the purchasing power of the people". Jute is the chief money crop of Bengal. According to the index numbers of wholesale prices in Calcutta the index number for the wholesale price (1914=100) of jute in April, 1934 was 40 as compared with 99 in August 1929, a drop of nearly 60 per cent. "The jute crop in Bengal for 1929, according to the final forecast, amounted to 8,729,570 bales and the average Calcutta price during that year was Rs. 11-2-7 a maund". Voluntary restriction had reduced the area under jute in the Province from nearly 3 million acres in 1929 to just over 2,517,000 acres in 1933-34. The crop for the year 1933-34, according to the final forecast, was 79,33,200 (Bengal 70,92,1000 ; Bihar & Orissa 4,73,200 and Assam 3,67,900) bales ; but the average Calcutta price did not rise above Rs. 3/8/- a maund. The value of the crop, therefore, fell from 47¾ crores

in 1929 to 13½ crores in 1933-34. The index figure of rice for December, 1933 was about 60 as compared with 124 for December, 1929 and the value of the crop to the cultivator in the year 1933-34 was 85 crores as compared with 170 crores in 1928-29—a decrease of 85 crores of rupees. The values of these two crops alone thus fell by approximately 120 crores. Under the circumstances the purchasing power of the people has dwindled down to a level which was unthinkable even six years back.

Thus we find that the economic position of India, and particularly of Bengal has been severely hurt and seriously imperilled and unless immediate and effective steps are taken to arrest the progress of decay and devise recovery measures to ameliorate the economic condition it may be too late to undertake the work of rehabilitation. For this, planned action is necessary and the complexity of the problem demands a careful study of the world conditions and the changes that are being introduced in the policy and methods of work in the other countries. The pursuit of a trial and error method at this stage would make us sink deeper into the morass of economic distress. The effectiveness of such measures can be ensured by constant vigilance and careful scrutiny of the world economic forces reacting on Indian conditions, and these should constitute integral parts of a definite economic plan. This aspect of the problem has been very strongly emphasised by Mr. N. R. Sarkar in his Presidential speech at the last Annual Meeting of the Federation of Indian Chamber of Commerce and Industry in the following succinct remarks :

“If countries endowed with a high economic standard like Britain, France and U.S.A. decide to refashion their monetary and exchange policies, we shall be compelled to modify our own policy in the light of such developments. Again, if our great foreign customers make new decisions as to what they should grow or make, what they should buy, how they would buy and from where, India, which produces, exports and imports an immense variety of goods, would have to make necessary adjust-

nients in her own economic and fiscal policy. If Japan decides to develop her own resources of pig iron, Indian pig iron, which depends upon the Japanese market, would either have to find other markets or be utilised in India itself. If, again, Japan decides to develop cotton-growing in her Empire or cultivate other sources of supply, the Indian cotton-grower will have to find new markets or the Indian cotton industry will have to be expanded to consume the surplus cotton in order to save the grower from ruin".

What we have said above refers to the defensive aspect of economic planning which is necessary to safeguard the integrity of the economic life of the people. But it cannot help a people to be merely on the defensive. In fact, defence demands constructive action and the constructive side of the work is even more important than the defensive side. This has been, fortunately for us, recognised not only by Englishmen like Sir Valentine Chirol, who declared that it is the duty and the interest of the Government in India to respond to the legitimate form of *Swadeshi* but also by the Government themselves who invited in 1930 Sir Arthur Salter, Economic Expert of the League of Nations to come out to India for the purpose of suggesting the formation of a suitable organisation which would devote itself to a "study of economic questions, including both the continuous interpretation of current developments and the consideration of plans designed to achieve particular purposes". There is no gainsaying that the valuable report submitted by Sir Arthur has influenced the economic policy of the Government of India which has secured the support of public opinion. Bengal and India possess special facilities to stimulate the work of construction. A plentiful supply of raw materials—some of them not to be had in any other country—is a gift from nature, while cheap intelligent labour in the country is the product of centuries of patient training. By arriving at a safe equilibrium between agriculture and the industries an economic structure can be built up which would easily withstand the attack of keen competition. Attention to

this peculiar aspect of our economic problem was drawn by Sir Arthur Salter in the following remarks :

“India's economic position at this period of her history may perhaps be thus described. She is at once one of the greatest of agricultural countries and also, by international recognition as expressed through the League of Nations, one of the eight principal industrial countries of the world. But her industries, while already important enough to secure her this position, are at present small in comparison with her agriculture, and small also in relation to the future extension which they are no doubt destined to achieve. The development which India contemplates may be presumed to be in the direction in which Canada has already made such progress, that of an improvement in the technique of economical agricultural production continued with the simultaneous enlargement of industrial and commercial activity. In this development, it may be anticipated that, as in other countries, and probably more than in most, the active assistance and guidance of the Government and the official machinery will be utilised”.

The policy of economic reconstruction which had been under the consideration of the Central and Local Governments in India was encouraged by war conditions and stimulated by post-war development till it was definitely stamped with the approval of the Salter Report and the Fiscal Autonomy Convention. The prevailing depression has made the work of reconstruction urgent. In Bengal an attempt is being made,—thanks to the interest taken in her people by His Excellency Sir John Anderson—to solve the problem of the reorganisation of the rural economy of the Province. In his speech delivered on the 30th November, 1933 adumbrating the new policy Sir John said :

“Agriculture is and must always be our mainstay in Bengal and we need a Recovery Plan here, as sorely as any country or State in the world. It is on agriculture, our staple industry—that we must concentrate. Raise

the economic status of the agriculturist who constitutes nearly 70 per cent. of our population and other things will follow,—industrial prosperity, healthy trade conditions, the development of primary education, a great extension of the scope for employment of the youth of the middle classes . . . and, with it all, . . . an easing of our budgetary position.”

His Excellency's words have been quickly translated into action. A Board of Economic Enquiry has already been set up and a Development Commissioner has been appointed. Land Mortgage Banks are being established and attempts are being made to build up a sound system of agricultural finance. A policy of debt conciliation is being thought out and formulated. And an Unemployment Relief Scheme for middle class people, drawn up by Mr. N. K. Basu, M.L.C., is already in operation under the direction of the Industries Department. It need hardly be said, that the supreme need of the Province is to balance its budget,—not merely the Budget of the Government, but the budgets of individuals also, i.e. mainly of the agriculturist.

Now that the Government have warned to their task and the people themselves have, in no uncertain voice, declared their determination to plunge headlong into the fight with the forces which threaten to bring about disaster to the country though it is deficient neither in natural resources nor in man power, the one thing necessary is to carefully evolve a recovery plan which will have two aspects—defensive and constructive or development. Without the one the other will fail to achieve the end we have in view. The characteristics of the plan should be its effectiveness, its thoroughness, its quickness and also its capability to capture the imagination of the people.

Nature of an Economic Plan for Bengal

Economic planning can have but one purpose—to guide the economic development of a people towards the goal of prosperity. Needless to say this cannot be done without the resources of the Government backed by the co-operation of

the people. Reference has already been made to the different conditions prevailing in different countries. To these must be added the social conditions in the different countries ; for, to ignore the social peculiarities of a people is often to court failure. The degree of government interference must vary with the form of government and the temper and traditions of the people. A plan to be successful should proceed along the line not only of least internal resistance but also of maximum social satisfaction. Government control is necessary, but not necessarily aggressive. Of the various types of economic planning that we witness to-day the Soviet, the Fascist and the American are the most well-known. They all have the same objective but the mode of work is different in each case. As the administrative and political position in Russia and Italy to-day are very dissimilar to those in our country we can hope and expect to derive the greatest possible benefit from a study of the American system which presents a sharp contrast to the other two systems. Mr. Roosevelt has shown that a scheme of economic planning can be attempted without upsetting the structures of Government or the generally accepted principle of private property. The National Recovery measures initiated by President Roosevelt are a striking example of a comprehensive scheme of reconstruction and development within the existing framework of society. As Mr. J. M. Keynes, one of the greatest of living economists, has observed—"Mr. Roosevelt has made himself the trustee for those in every country who seek to mend the evils of our condition by reasoned experiment within the framework of the existing social system. If he fails, national change will be gravely prejudiced throughout the world, leaving orthodoxy and revolution to fight it out. But if he succeeds, new and bolder methods will be tried everywhere. It is for these reasons and not merely because we should all like to escape from the slump that more than ordinary importance attaches to the outcome of the President's experiments".

India does not aspire after Socialism as it is understood or interpreted in the West, nor does she value the ideal of the West. Her ideals are essentially different and are at variance

with the ideals of Socialism. If India is to progress she must do so through her own traditions and march along the path which experience has pointed out to her as leading to her goal.

But India is more a continent than a country, and in economic matters it is neither possible nor advisable to treat the provinces as a homogeneous whole ignoring the difference between the fertility of the flood-stricken fields of Bengal and the barrenness of the arid deserts of Rajputana. Nor should we overlook the characteristics of the people of the different parts developed by environments and heredity and preserved in social customs. Naturally there cannot be any one economic plan for the whole of India. And it is in the fitness of things that the Provincial Governments have been endowed with ample powers to deal with the economic needs of the provinces.

The problems of irrigation, agriculture and the industries are different in different provinces, and provincial problems must be solved through provincial agencies. True, some of the auxiliaries to our economic activities, such as matters relating to currency, customs, railway freight, tariff, etc. being all-India subjects are outside the control of Provincial Governments. But in spite of this drawback there is ample scope for the provinces to develop their recovery plans and carry them through. It is to be hoped that the inauguration of the new Constitution with its federal structure will invest the provinces with ampler powers and resources to develop on their own lines and according to their own needs. No more need be said in justification of provincial plans. They carry in them their own justification.

The resources, moreover, at the disposal of each Government are far from uniform. That is more the reason why the amount of support—specially financial—which can be secured from the Government must differ in the different provinces. Bengal's standard of expenditure has, unfortunately for the people of the Province, always been low. And the success of any economic planning in Bengal must to a great extent depend on the organised support and efforts of the people. It is to be hoped that the people will not fail to realise what the Government have fully realised and frankly admitted. His Excellency

the Governor of Bengal has said—"If an effort is to be made worthy of the occasion and equal to the crying needs of the situation, the best elements in the community must be harnessed to the task".

The inevitable limitations of a provincial plan need not necessarily detract from its utility and importance, nor provide reason for pessimism about its immense possibilities. On the other hand its limited scope admits of its being more ardently worked for the benefit—nay the salvation of the people of the Province.

Object of Planning for Bengal

As has been explained before a scheme for planned economic action in Bengal must have a two-fold object. It should provide means for recovery from the distressing effects of the present depression which is assuming alarming proportions, and it should devise means to effect permanent and progressive improvement in the basic economic structure of the Province by the elimination of its inherent weakness *viz.* lack of equilibrium between agriculture and the industries. Unless this equilibrium is established and maintained there will always remain the danger of lapse into the position in which the depression has brought the Province. The depression, moreover, is a world factor from the results of which no province or country can escape unscathed. But if the depression can induce us, as it has induced Italy, Turkey and other countries, to explore every avenue for the development of our Province it will certainly prove a blessing in disguise. It will help us to eliminate the weakness of our economic structure and strengthen its foundations.

The gravity of the task that the framers of the plan will have to realise in perfecting it will become apparent from the depth of the standard of living to which our masses has sunk.

Sometime back Dr. Harold Mann made a careful study of the situation and arrived at the conclusion that between the

pre-war period and now there had been rises in the cost of living (taking a family of four indicated as the unit) of—

- (1) 150 per cent. in the case of labourers,
- (2) 103 per cent. in the case of artisans, and
- (3) 85 per cent. in the case of clerks.

“The rise affects”, he remarked, “the labouring classes more than any other.” If the price of necessities of life has gone down because of the depression the wage level has gone down also and the labourers are workless. The price of agricultural produce has become unremunerative.

The subsistence wage must be carefully distinguished from the living wage, and the former should be at least Rs. 33 per mensem for an average family of five. The total necessary monthly expenditure, *exclusive of any allowance for lighting, medicines, education, etc., must be estimated at present as follows :—*

Food	...	...	Rs. 25-7-3
Clothing	...	...	„ 5-2-2
House rent or repair	...	...	„ 2-0-0

Now, this does not take into account the inevitable expenditure that has to be incurred for sickness and social obligations which are unavoidable if one has to be a member of society.

The whole thing thus boils down to this that unless and until the monthly income of the agriculturist, who forms 70 per cent. of our population, exceeds Rs. 35 to Rs. 40 a month *he cannot but be hungerstricken, and starving and eventually insolvent.*

This sad condition cannot be changed without recourse to a comprehensive plan including every sphere of activity ; and much must depend on the effort the masses can put forth and the change in their outlook of life. The awakening of the minds of the people alone can supply the motive power to progress. In the words of Mr. Moreland*—“at the heart of the problem lies the development of the desire for a higher standard of living. The will to live better must furnish the

driving power." A re-orientation of the mentality and outlook of the masses as also of those living in cities, is immediately necessary. As Sir Frederick Sykes has put it†—the gospel of freedom and the right to demand and obtain better conditions of life should be preached to these simple people.

A prosperous country is one in which the great mass of the inhabitants are able to procure with moderate toil what is necessary for the subsistence of *human* lives—lives of frugal and assured comfort of men, as humble social beings. Judged by this criterion India cannot be said to be prosperous. The productive agents have not been utilised to the best advantage of the country.

The first requirement of the Province, and of the country, is, the augmentation of its wealth—and that by suitable adjustment of its productive agents. We must not restrict ourselves to agriculture only. The insecurity of agricultural production is only too apparent. Except in irrigated tracts, agriculture in the country is a gamble in rain. Then again with all her bounty, nature is infinitely capricious. The monsoon may fail or, what is more likely, may break near the hills flooding the whole country, or the rain may come at the wrong time. Further, the experience of the depression period unmistakably exposes the unwisdom of placing too much reliance on agriculture alone. The price of agricultural produce generally suffered more than that of the finished products in the depression, firstly because of over-production and lack of holding capacity, and secondly, due to the growth of Economic Nationalism in the raw material importing countries and the consequent restriction on imports. It has, therefore, become imperative that side by side with agriculture, industries must be developed, particularly those which will consume indigenous primary products and also those that are imported for internal consumption. The development of export industries may come later on, but those like jute, for which we have the monopoly

* Moreland—India at the Death of Akbar.

† Sir Frederick Sykes—Village Improvement Scheme.

of raw materials can succeed at all times as the indigenous jute industry has proved. Briefly, there must be a dynamical equilibrium between agriculture and industry in the country; else, the entire economic structure may be found to have been set on an unsound basis. In this connection the fact that diversity of occupations is needed for development of human faculties ought not to be lost sight of. Its absence tends to reduce the people to a homogeneous mass. •

In agriculture, the cultivation of various products is to be regulated from the following considerations:—first of all, the country must be self-supporting in food stuffs and also in raw materials required by the indigenous industries; next, attention has to be directed to export markets and here very careful considerations will be necessary. The developments of Economic Nationalism everywhere as well as the advent of Empire Preference following the Ottawa Agreement have altered the prospects of many agricultural crops. Also, the monopolistic nature of certain products necessitates, in these days, attention to the theory of monopoly price. A careful survey of the position of these agricultural products may reveal that the production of certain crops may be regulated and new products substituted in the released land. Soil analysis and other problems are to be studied in connection with these prospective substitutes.

The problem of industrialisation should be studied simultaneously. Naturally, efforts are to be directed first of all to those industries whose products are consumed locally and those for which the raw material is found within the country. The case of cottage industries should not also be left in the background in this connection. From the considerations of the limited resources of the Province, the availability to-day of suitable power and standard small machines, the size of organisations, and the absence of overhead and transport charges, and lastly, from the nature of the social and economic structure in which the agricultural producers have no occupation during the major part of the year, it is becoming increasingly apparent and being felt too that cottage and small industries

possess possibilities in the Province and in the country, the magnitude of which cannot be overrated provided the organisations are planned on sound lines.

A complete economic plan for the country must include within its purview the problems of both large-scale and cottage industries. By a natural process of development handicrafts grow into manufacture and trade expands into commerce. In India in the past, save and except seats of Government, towns were nothing more than overgrown villages. But in modern India towns have grown up as centres of industries, prominent among these being Cawnpore with a population of 243,755, Ahmedabad with a population of 313,789 and Howrah with a population of 224,873. But these industrial towns are not the only places where flourishing big industries have been located. Bombay with its cotton mills and Calcutta with its surrounding jute mills are as important, industrially, as any industrial town, while most of the towns can boast of some mills and factories.

The importance of these large industries is easily understood by the amount of capital invested in them and the number of labourers they employ. Industrially Bengal is far from being fully developed ; yet the figures available for Bengal for the year 1931 but published in 1934 are as follows :

Persons employed

Industries :—

Cotton (spinning, weaving and other factories)	...	...	...	18,033
Hosiery	...	...	...	500
Jute Mills	...	...	...	268,289
Silk Mills (including filatures)	...	...	...	310
Woollen Mills	...	..	...	126
Miscellaneous	...	...	...	.....
Total ...				287,258

Engineering :—

Coach Building and Motor Car repairing	2,006.
Dockyards	2,744
Electrical Engineering	1,577
Electrical Generating and transferring stations	2,776.
General Engineering	21,179.
Kerosene tinning and packing	4,292
Metal stamping	955.
Railway workshops	28,852
Shipbuilding and Engineering	11,796
Steel trunk, lock and cutlery	
Tramway works	997
Miscellaneous	440
Total	77,614

Minerals and Metals :—

Foundries	
Iron and steel smelting and sheet rolling mills	6,716
Lead smelting and lead rolling mills	266
Mica works ... ..	.....
Miscellaneous	345
Total	7,327

Food, Drink and Tobacco :—

Bakeries, biscuit and confectionary	646
Breweries and distilleries	353
Dairy produce ... ..	.....
Flour Mills	1,149
Food Canning and Bottling	27
Ice and aerated waters	1,021
Rice Mills	11,560.
Tea Factories	14,728
Tobacco Factories	123.
Water Pumping Stations	1,364
Miscellaneous	332
Total	31,303.

Chemicals, Dyes, etc. :—

Bones and manures	...	...	1,386
Chemicals	...	...	2,262
Gasworks	...	...	890
Lac	...	...	536
Matches	...	...	5,270
Oil Mills	...	...	2,398
Paints	...	...	1,171
Soaps	...	...	244
Miscellaneous	...	...	176
Total	...	...	14,333

Paper and Printing 14,103

Processes relating to Wood, Stone and Glass ... 3,991

Processes connected with skins and hides ... 455

Gins and Presses 31,059

Miscellaneous :—

Ordinary factories, etc. 10,641

The grand total thus comes up to 478,090—a figure which, evidently is lower than the actual figure. It is an admitted fact, however, that industrially Bengal, like most of the other provinces of India, is progressing.

It is hardly necessary to say that the big industries have come to stay and will develop under proper care and guidance. While we are confident that the big industries have a useful purpose to serve in our economic arrangement we cannot and should not underestimate the unique and important place our cottage industries occupy in it. Though they have been struggling against various disintegrating forces their inherent strength alone has kept them alive. The fact that the hand loom still survives in India and is the most important cottage industry testifies to its inherent strength which, as has been demonstrated, can be increased by the introduction of improved devices and the organisation of better marketing facilities. The decline of many of these industries can be clearly traced to neglect resulting in lack of organisation. The manifold

where the system, which the Italians call *Bonificazione*, is not purely agricultural betterment but is also intended to banish malaria, while in England which is malaria-free, the farmers on the banks of the Trent, and elsewhere, have for years been fertilising their lands by capturing the muddy waters of the river and detaining them until they had deposited their silt.

This is how irrigation comes in to take its place in the scheme of reconstruction and development. And irrigation, it need hardly be said, is natural and artificial. Artificial irrigation has its advantages but is not altogether free from some disadvantages. It makes the subsoil water-logged and often the land loses its fertility. But natural, i.e., flood or overflow irrigation is altogether beneficial—the rich red water of the flood is liquid gold. It not only enriches the soil and improves the output of the crop but also banishes malaria by drowning the mosquito larvae and flushing tanks and water channels.

The small experiment that has been and is being conducted in parts of Midnapur in Bengal seems to be pregnant with possibilities. It may be too early yet to pronounce an opinion on the experiment ; but it is certainly worth extending to other parts of the Province which are being depopulated by malaria. There is yet another kind of irrigation which was practised by the people in many parts of the country where flood or overflow irrigation was not possible. The remains of such arrangements are to be found in the large and neglected reservoirs in many agricultural areas and the student can still study the system in Bishnupur (Bankura).

To make flood or overflow irrigation successful a thorough "level survey" of the areas to be dealt with is necessary. This has already been done in certain areas in the districts of Hooghly, Howrah and Burdwan.

Along with the question of irrigation, investigation should be made as to how to combat noxious weeds—a danger which is certainly grave in Bengal and some of the adjoining provinces where the water hyacinth has been blocking the waterways with

a rapidity that is alarming. It is also making the water unfit for drinking purposes, fields unfit for growing crops and transport increasingly difficult.

Incidentally we would like to mention the cases of industries which disappeared from the country but which can be revived under the present altered conditions ; also those which can be introduced to meet the growing internal demand. We would further stress on certain aspects of marketing organisations for the benefit of the trade and industries, both existing and prospective. Fifty years ago there was a prosperous date-sugar industry in Bengal and big European concerns found it profitable to establish factories in several mofussil towns and villages to manufacture date-sugar. Sir James Westland's Report on the District of Jessore published in 1870, gives a vivid description of the industry :—"One of the most important industries in the district of Jessore is the cultivation and manufacture of date-sugar. All over the north and the west of the district and to some extent also in other parts of it, the ryots may almost be said to depend more upon sugar cultivation than upon any other branch of agriculture. Of course other cultivation demands their attention, and forms no mean part of their livelihood ; but there are so many people who derive from sugar all that they have above the mere necessities of life, that it may be considered that the sugar cultivation and trade is the root of all their prosperity." Sugar industry now enjoys high protection and in the fitness of things every effort should be made to revive the industry.

Not only here, but in many cases can it be shown that all that could be done has not yet been done, because no economic plan was prepared. A good instance is furnished by the decline of the indigo industry. A splendid opportunity of rehabilitating the old indigo industry of the country was thrown away during the War. It is well known that the industry owed its decline to the introduction of synthetic dyes from Germany. After the Great War, when the German industry was in difficulty, there was an opportunity for putting the natural indigo industry on its old footing. But our Government, in the absence

of a definite plan, could not do so, when the Government at Home took over the German synthetic business and subsidised a factory for artificial dyes in England. No steps were taken to make the British Government recognise the claims of the Indian industry. Had there been a scheme of planned economy, the claims would certainly not have been allowed to be ignored and careful research would have been undertaken to resuscitate the industry.

As for new industries closely associated with agriculture, mention may be made of animal husbandry. Strangely enough, while other countries are profiting by the introduction of specimens from India, animal husbandry is being sadly neglected here.

According to Mr. Taine, the famous French savant, not only England but several other Western countries, eager to improve their animal husbandry, have introduced the best specimens from India. He mentions how English farms were profiting by importing bulls from our country. And how many of us are aware of the important part played by sheep from Calcutta, which were introduced in 1798, in the romantic rise of Australia's wool industry? Australia to-day has well over 110 million sheep and directly and indirectly more than 100,000 Australians depend on the wool industry for a living of comfort and, in some cases, of plenty. The origin of this industry goes back to 1793. Capt. John MacArthur, a young Devonshire Officer, who set out in 1790, and who was given a grant of land three years later, was the pioneer of the sheep industry. He saw the possibilities in the genial climate, and the soil and feed conditions, and began to rear a breed out of the fat-tailed hairy piebald sheep from the Cape, sheep from Bengal and the Spanish merino. This breed now known as the Australian merino, is the best wool-producing animal the world has ever known. MacArthur's first flock consisted of 50 Bengal ewes and six or seven rams of mixed English and Spanish descent.

Taine's remarks about England importing Indian bulls to improve the breed of her cattle cannot but make one deplore

the neglect and criminal waste in our cattle wealth we indulge in. India still possesses very good breeds of cows. The Sind breed of cows has long been famous for the large yield of milk. Since the animal breeding department took over the farms in the suburbs of Karachi, the average yield per cow has risen to nearly fifteen and a half pounds per day; six cows at the Malei farm had yielded over five thousand pounds of milk per year of three hundred days, whilst one special cow is reported to have yielded approximately ten thousand pounds in three hundred days. A few years back an agitation was made protesting against picked Karachi cows being purchased and taken away to foreign countries. It has been found that cross breeding can produce satisfactory results. This was demonstrated in the case of what is known as Taylor's Breed now naturalised in Patna. But how are we neglecting this wealth? We quote the following from *Dairy Farming in India* by Majors D. J. Meagher and R. E. Vaughan of the Indian Army—

“Large numbers of milch cattle pass down yearly to Calcutta . . . and are there sold to local *gowallas*. At the end of the cold weather, when the cows are beginning to run dry, and the sales of milk tend to decrease, they are sold to the butchers for slaughter, to avoid the expense of feeding through the summer months in a place where pasturage is scarce and stall rent high. This rapid exhaustion of stock ends in scarcity of supply and consequent rise of prices in the breeding districts.”

The attempts of the Calcutta Corporation to put a stop to the slaughter of prime cows have not been successful. Thus are milch cows of approved breeds slaughtered every year to the detriment of our cattle wealth. Milk naturally becomes scarce and the dairy industry droops. The same is the case with our poultry industry.

Pisciculture, another fruitful source of our industrial well-being, is sadly neglected in Bengal, where it is no exaggeration to say that 75 per cent of the people are in the habit of taking fish with their daily meals. The following is the abstract state-

ment of total imports of fish into Calcutta by rail routes for the five year ending 1922-23 :—

Year.	Quantity.	
	Mds.	srs.
1918-19	308,037	17
1919-20	312,975	34
1920-21	370,119	20
1921-22	417,684	24
1922-23	435,194	21½

This is hardly sufficient for the increasing population of Calcutta. That ordinarily the supply falls short of the demand has been recognised. In their Resolution (dated 3rd March, 1908) on Mr. K. G. Gupta's Report on the Results of Enquiry into the Fisheries of Bengal and into Fishery Matters in Europe and America the Government of Bengal said :—

- “The supply of fish in this province is quite unequal to the demand, and is far smaller than it is in the British Isles. On the other hand the demand for fish is greater than elsewhere. Comparatively few people eat meat, whereas at least four-fifths of the population are fish-eaters. Fish is specially necessary amongst a population whose principal food grain is rice. Not only is the supply of fish not equal to the demand but there is reason to fear that it is actually diminishing.”

In order to ascertain what can be done to remedy this unsatisfactory state of affairs Mr. (afterwards Sir) K. G. Gupta, then Member of the Board of Revenue, was placed on special duty in August, 1905. He made extensive enquiries throughout the Province and subsequently when he proceeded on six months' leave he was placed on special duty to study in Europe and America various important questions connected with fishery administration, and particularly the measures which were there taken to improve, by artificial means, the natural supply of fish.

Sir K. G. Gupta's reports were duly published and are a mine of information. We are not aware of the expenditure that

was incurred on this enquiry in India and abroad 'but, unfortunately for us, very little could be done to remedy the unsatisfactory state of affairs. The Fishery Department of the United States of America scatters every year at considerable expense to the public exchequer, millions of young fish into the rivers of America to replenish the old stock. This example is suitable for Bengal. But not only has it not been followed but what is more is that the Fishery Department of Bengal, Bihar and Orissa, brought into existence in 1913, was abolished in 1923 on grounds of financial stringency.

Financial considerations have been responsible for various drawbacks to progress in the Province, the maintenance of an Industrial Museum not excluded.

The importance of a Commercial Museum cannot be over-estimated. When the Great War disturbed the economic arrangement of all countries the Government of India felt its want keenly in India. They decided to organise a sample organisation which was started in Calcutta and passed on to Madras, Cawnpore, Delhi and Lahore with specimens of imports of enemy countries. It was afterwards decided that the exhibition in itself was not sufficient and that a complete museum on a broad and permanent basis was necessary. It was expected to do much to bring purchasers and producers together. There was to be an order-book in which the requirements could be registered. Articles could be obtained and would be similar to the goods on exhibition. There was to be an enquiry office attached to the museum, to receive all enquiries. As a local newspaper said at the time—

“The Museum (in Calcutta) is the first of its kind to be started in India, and the advantages which Indian manufacturers and traders generally are likely to derive as a result of its future operations cannot be too strongly impressed upon those who have the promotion of indigenous industries at heart. Lack of organisation and modern methods of business enterprise on the part of Indian manufacturers have in the past been the chief

causes of the extension and increasing success of foreign competition in the markets of this country and, at the present time specially, every movement that will tend to extend the scope of the industries of India and help to reveal the importance of co-operation deserves the widest encouragement and publicity. It is for the last named purpose that a Commercial Museum has been established in Calcutta."

The central idea of the Museum to which reference has been made was explained by Lord Carmichael to be the same as that of the exhibition organised, but the idea had expanded. "The producer can come here", said he, "to study the article which met the consumer's want but which is now no longer available ; and the consumer can come to see what local product he can obtain to take the place of the foreign article which formerly supplied his needs. But, in addition, the producer will find in this Museum articles produced in other countries to meet India's needs made from raw materials procurable in India and in some cases from raw materials not only procurable, but actually procured in India."

As soon, however, as the "protection" offered by the War was withdrawn the Museum became neglected and ultimately the collection was broken up and the institution closed. But while the Indian Commercial Museum was closed, Japan came forward in 1927 to establish a permanent exhibition of Japanese goods in Calcutta with a view to developing her trade in India. Prior to this, in 1890, Mr. Sutezo Nishimora, then Governor of Osaka, had been instrumental in founding a Commercial Museum in Osaka which is now looked upon as a commercial and industrial machinery of great importance not only in Osaka but in every part of Japan.

A museum and a bureau of commercial information are essential for the industrial development and commercial progress of a country, and must occupy a prominent place in any plan of reconstruction and development.

The interdependence of and the close connection between

the various departments of activity which make for progress demand that any scheme to be successful should be carefully considered and formulated.

Every country has its peculiarities not only in the climatic conditions, the material resources and the needs of the people but also in its social customs and industrial traditions. The last two, *specially the third*, are liable to change and we have witnessed its change in India as will appear from the following account given by Sir Thomas Munro in the first quarter of the nineteenth century :—

“Glassware is in little request, except with a very few principal natives, and among them is confined to mirrors and lamps and it is only such natives as are much connected with Europeans who purchase these articles.”

To-day we want more glass factories than exist in the country. But the peculiarities must be taken into account in preparing a plan or scheme of development which must not give a rude shock to the majority of the people who are naturally orthodox and prone to look with suspicion upon anything new—anything which deviates violently from the *mamool*.

Last, but not the least, comes the element of time. It may take a comparatively long time to reap the full harvest but the green shoots containing the promise of the obliteration of the scars must be seen above the ground within a comparatively short time if only to put heart into the drooping and despondent people and create in them the required enthusiasm for the work. Art begins in the upper classes of people, but energy and character come from below. The masses must be shown some tangible result of the work to which they are asked to contribute ; and as “hope deferred maketh the heart sick” so delay creates in them the paralysis of indecision.

A scheme, therefore, to maintain the energy of the masses must bear its first fruits by five years, at most.

There is yet another reason for this time-limit. As explained by G. T. Grinko in his work on the Soviet Union's 5 Year Plan—“Before sufficient experience has been accumu-

lated, there will be an opportunity to learn from practical experience the conditions and possibilities of the reconstruction period, before the size and character of the difficulties besetting it can be possibly gauged, or its potentialities fully realised, it would have been unwise, short-sighted and mistaken to attempt to present to the country and the world, a general fifteen year plan for the development of the national economy of the Soviet Union."

Having laid down the conditions essential for a scheme of planned economy I will now proceed to place my suggestions for the formulation of a scheme of reconstruction and development which will include all departments which must be dealt with to ensure the success of the scheme.

As India is more a continent than a country the ambition of each province to be autonomous is not only legitimate but also necessary. We shall, therefore, confine ourselves to Bengal with her population of 52½ millions and her variety of soil, climate and social customs. Bengal has her own peculiar problems to solve and these are by no means easy of solution. As His Excellency the Governor of Bengal has said—"If an effort is to be made worthy of the occasion and equal to the crying needs of the situation, the best elements in the community methods, like the problems, are, therefore, essentially different. between the method thus adopted and that dictated by the Soviet Union is that while the former rests on the willing co-operation of the people, the latter depends on the autocratic power with which the Government has been invested. The methods, like the problems, are, therefore, essentially different. In Russia, Lenin said in 1918—"We, the Bolshevik party, have convinced Russia. We have won Russia from the rich for the poor, from the exploiters for the toilers," and in 1929 Joseph Stalin took credit for the work when he declared—"We are going full steam ahead through industrialisation towards Socialism, leaving behind the age-old Russian backwardness." India does not aspire for Socialism as it is understood or interpreted in the West, nor does she value the ideal of the West. Her ideals are essentially different and are at variance with the

ideals of Socialism. If India is to progress she must do so through her own traditions and march along the path which experience has pointed out to her as leading to her goal.

But while we cannot imitate the plan of Russia we must confess that in this matter Russia has shown "a light to all men". She has been making an experiment which is of interest not only to herself but to the world at large.

The experiment may be successful, or it may fail. But, if it is the first step that counts, glory that belongs to the pioneer must be conceded to Russia. Any attempt to minimise the importance of her experiment will be like an attempt to filch from the victor's brow his laurel crown.

Already other countries are contemplating the framing of plans for economic reconstruction. Turkey, which has emerged from the misrule of the Sultans and the oppressive multiplication of those fat maggots and creeping parasites that breed in the warm comfort of tyranny and maladministration, is bent on trying a similar experiment.

Italy is following an active policy of State-aided development. We have also heard of China inaugurating a Five Year Plan on the lines of the Russian Gosplan. Even England, the traditional home of the *laissez-faire* policy is going ahead. The need for economic planning on a comprehensive scale has been frankly recognised, and recent writers there are emphasising the necessity of a National Economic Planning Organisation. But the greatest experiment in planned economy is being made to-day in the United States of America. The National Recovery measures initiated by President Roosevelt are a striking example of a comprehensive scheme of reconstruction and development within the existing framework of society. As Mr. J. M. Keynes, one of the greatest of living economists, has observed—"Mr. Roosevelt has made himself the trustee for those in every country who seek to mend the evils of our condition by reasoned experiment within the framework of the existing social system. If he fails, national change will be gravely prejudiced throughout the world, leaving orthodoxy and revolution to fight it out.

But if he succeeds new and bolder methods will be tried everywhere. It is for these reasons and not merely because we should all like to escape from the slump that more than ordinary importance attaches to the outcome of the President's experiments''.

Mr. Roosevelt has shown that a scheme of economic planning can be attempted without upsetting the structures of Government or the generally accepted principle of private property and thus his experiment stands in sharp contrast with the methods of the Soviet system of planning. He has discarded the perilous path of revolution, and his magnificent efforts are being watched with keen interest in every part of the civilised world.

In India, and in Bengal, we cannot afford to wait ; we cannot bow low before the blast "in patient deep disdain" ; we cannot ignore realities. We must apply ourselves to solve our problem of economic planning. Let every one of us take up the duty before us and remember—

"Men, my brothers, men the workers,
ever reaping something new ;

That which they have done but earnest
of the things that they shall do"

is not merely the dream of the poet, but an ideal for mankind.

CHAPTER II

AGRICULTURE—THE BASIC INDUSTRY

Crops

In one of his characteristically impassioned speeches, Lord Curzon, as Viceroy of India, referred to "the Indian poor, the Indian peasant, the patient, humble, silent millions, the 80 per cent, who subsist by agriculture, who know very little of policies, but who profit or suffer by their results, and whom men's eyes, even the eyes of their own countrymen, too often forget"—and said, "We see him not in the splendour and opulence, nor even in the squalor, of great cities ; he reads no newspapers, for, as a rule, he cannot read at all ; he has no politics. But he is the bone and sinew of the country, by the sweat of his brow the soil is tilled, from his labour comes one-fourth of the national income, he should be the first and final object of every Viceroy's regard."

Though India has been aptly called a "peasant empire", because agriculture happens to be its basic industry, its importance was not fully recognised until Lord Mayo came out as Governor General of India. Lord Mayo realised, an amateur expert as he was in it, the importance of the development of agriculture in India such as no Viceroy before him did. Of him it is said that as a gentleman farmer he might have been able to make a decent living out of farming in which early in his career as a public-man he became interested as a result of the noble and devoted services he rendered to the State in the Irish famine of 1846 when he was not more than 20 years old. It is also said of him that as an expression of his pride in the eminent usefulness of the boy his father made a present of a "farm" to him so that he could bring the knowledge he had gained by his work in the late famine to bear upon practical farming, not as a pastime but as a profession. Mayo managed and equipped his farm so well that he would easily

be mistaken for a trained farmer and an agriculturist even though he was far too deeply immersed in politics immediately prior to his appointment at 29 as Chief Secretary for Ireland. Mayo's interest in politics and administration took a practical shape in his passion for the re-introduction of agriculture in India on an improved and scientific basis. Early in his career in India, Mayo conceived the constitution of a Department of Agriculture in India. He proposed to name it the Department of Agriculture, Revenue and Commerce giving agriculture the place of honour and as a source of revenue and feeder of commerce. The Secretary of State, however, turned it down and said that "Revenue and not Agriculture was the main object of the Department and ordered the name to be altered to 'Revenue, Agriculture and Commerce.'" Yet Lord Mayo had confidence in his claim, for he often said, "We must have patience, it will all come right." The Department, of which Mayo was the founder in the best interests of India, came to be closed in 1879 by Lord Lytton and reopened by Lord Ripon in 1881 who more than any other man, next to Mayo, realised that India's prosperity depended upon the prosperity of her agriculture. But it has taken a long time for things to be set right. To their credit we find the Government turning their attention seriously to agricultural improvement, only it may be said that their activities have not begun a day too soon. In 1927, Lord Irwin wrote a foreword to a new quarterly journal started by the Imperial Department of Agriculture in India dealing with cattle-breeding, dairying, cultivation and storage of fodder crops, animal nutrition and other aspects of animal husbandry. He remarked as follows :—

"At present the tendency of the educated classes is to immerse themselves in politics or the law. These two spheres of action are important and necessary for the constitutional administration of the country, but they are not the vital necessities on which the people of India depend for their very existence from day to day. What is the good of concentrating on strong reins to drive a horse or on rubbertyred wheels to make the carriage comfortable if the horse is so weak that he cannot

pull the carriage, or the carriage so frail that it falls to pieces directly anybody sits in it?

“Education, therefore, should be directed into practical channels and it should be the first aim of all of us to do everything we can to foster and improve that basic industry of agriculture on which India, more perhaps than any other country, is dependent.”

This foreword has a ring of sympathy and sincerity which is evident and it was the consciousness of a duty, a supreme duty, born of a tender regard for human well-being in India, which was responsible for the appointment of the Royal Commission on Agriculture in 1926—the first of its kind in India—appointed specifically to examine and report on the conditions of agriculture and rural economy in India into which no doubt the Famine Commission of 1879 had gone and produced their comprehensive report of which full advantages were taken as we have observed before by Lord Ripon in 1881 in reopening the department of agriculture.

Prior to this, on the 4th of June, 1903, the Government of India had addressed to the Secretary of State a despatch with which was submitted a scheme for the establishment of an agricultural research institute with an experimental farm and an agricultural college as necessary adjuncts and complements to it. To the establishment of the research station Lord Curzon devoted the greater portion of a donation of £30,000 which had been placed at his disposal by an American gentleman, Mr. Henry Phipps of Chicago, to be applied to some object of utility preferably connected with scientific research. In 1905 the Government of India had announced their intention of setting aside annually a sum of Rs. 20 lakhs which was subsequently increased to Rs. 24 lakhs for the development of agricultural research, experiment, demonstration and education in the Provinces.

A beginning had thus been made to improve the basic industry on which not less than 80 per cent of India's population depend for their subsistence and existence.

And after all what is the economic problem of India briefly stated? What are the wants of her people? They are Food, Clothing, Housing, even the roof over his head has to be grown by the cultivator. The three are one—Agriculture.

The problem of feeding the hungry mouths of an increasing population is by no means easy of solution. Reading a paper before the East India Association on the 27th February, 1934, General Sir John Magaw drew pointed attention to the most alarming fact that between 1921 and 1931 not less than 24 millions were added to the population of India.

"About 60 per cent of the people", observed Sir John, "were reported to be poorly or badly nourished. Malnutrition due to unsuitable diet was the rule rather than the exception. The average amount of milk consumed by each person worked out about 3½ ounces daily; nourishing protein and vitamins were obviously insufficient in the great majority of cases. It was reported that scarcity or famine had occurred at some time or other during the previous ten years in 22 per cent of the villages which were surveyed."

"Economists", added Sir John, "are no longer regarded as infallible, but they are on safe ground when they assert that the amenities of civilised life are provided by the surplus of production over what is needed to maintain life. If, as seems to be the case, this surplus is dwindling in India, what is to happen to the structure of civilisation? How are the Army and Police to be maintained? How will education and public health be provided for? How will trade and commerce fare?"

The obvious reply is—production must be increased. It should be increased not only to feed the people and clothe and house them—to meet their urgent demand, but also to secure the necessary capital for industrialising India. The problem of industrialising the country can no longer be put aside. Already our placid slumber of plenty has been rudely disturbed by disquieting dreams of poverty and peril. Capital has to be found for establishing industries but how is it to be found? The people of India have been blamed for

hoarding gold: but it looks as if the sale of this hoard has only served to stave off the evil day during the past two years. So capital has to be created, to be purchased by exchange. It is not impossible. America's industrial development is a case in point which can be cited as an instance. "It was as food-producers that the Americans got their first start in international trade. Their wheat and beef and cotton exports provided them with the money to build factories and iron works. Even yet now their largest industries are closely connected with agriculture. As agriculturists they scored their first and greatest success." America successfully got control of, nearly all of England's principal food-supplies. Eighty per cent of the cultivated area is occupied by four groups—corn, wheat, cotton and oats, namely,

		Acres
Corn	...	83,321,000
Wheat	...	42,495,000
Oats	...	27,365,000
Cotton	...	23,403,000

English economists have tried to find out the causes that contribute to America's success. The conclusions arrived at regarding soil and climate, i.e. natural advantages, are:—

(a) That both, i.e. soil and climate, have in the United States a very wide range and corresponding diversity.

(b) That in certain large areas they are eminently favourable to particular kinds of culture, as cotton in the Southern States, fruit on the Pacific slope, and cereals in the Mississippi valley.

(c) That these favoured regions, though extensive, form a small proportion of the total area of the Republic, and moreover, they are approaching the limit of their capacity.

(d) That American soil is easier to cultivate than English soil and the American weather is less tantalising.

(e) That the superior fertility of British soil and its proximity to large centres of consumption appear to be more than

counterbalanced by greater efficiency and economy in American methods of farming.

India too has a very wide range of soil and climate. Certain areas here are eminently suitable for particular kinds of culture. Indian soil, specially Bengal soil, is easy to cultivate and the Indian farmer is without doubt more economical than his *confrère* in Europe or America. But he has to be taught many things to enable him to hold his own against foreign competition which, even in agriculture, is growing keener every day. Natural advantages alone cannot and should not be relied upon. As has been found, the superior fertility of the British soil and its proximity to large centres of consumption have not been able to stem the tide of American import.

Here the example of Egypt will be of interest to us. Lord Cromer's annual report published in 1906 contained the following remarks:—

"The wealth of Egypt has, from time immemorial, been proverbial; but in spite of all that has been said on this subject, I doubt whether the natural advantages of this highly favoured country are as yet generally or fully realised. Moreover, it is, perhaps, forgotten that in the long course of Egyptian history, it is only during the last quarter of a century that nature, with a certain amount of aid from man, has had an opportunity of showing the productive capabilities of the country. Hence, the sudden rise in material prosperity comes as a surprise and a revelation to the world."

This "certain amount of aid from man" is essentially necessary to develop even the agricultural wealth of every country. It has been proved that the irrigation system of ancient Mesopotamia made the tract so fertile that the name "Garden of Eden" was given to it. The waters of the two rivers, Tigris and Euphrates, were taken through irrigating channels to produce bumper crops on land, which, now that the canals have silted up through neglect, has been converted from fertile fields into an arid desert. The Turkish Government of Mesopotamia realised it too late, and about the year 1910 invited Sir William

Willcocks, the great irrigation engineer to prepare a 'scheme of irrigation and drainage for lower Mesopotamia. The estimated cost of carrying the project into execution was something like £20,000,000, a sum far beyond the range of the Turkish exchequer, and hardly likely to be contributed by foreign capitalists as an investment considering the unsettled state of Iraq. Some of the old works too were of astounding magnitude—for instance, the Nahrwan Canal, which dates from Chaldean days, and had a total length of about 300 miles along the eastern side of the Tigris, its breadth, over long stretches, being from 100 to 150 yards, and its depth from 40 to 50 feet.

Thus nature was helped by man to produce the Garden of Eden. In India too the potentialities of a huge treasure house of Nature, sealed through long periods of *ignorance and neglect*, are awaiting only the "open sesame" of the modern irrigation engineer to unlock its portals and double the supply of agricultural wealth. This has been well understood by the makers of Modern Egypt. They have prepared an ample programme for the agricultural department which would not only establish experimental farms to deal with manures and methods of cultivation but would introduce agricultural banks among and for the benefit of the village communities. It would have a *weather bureau*, forecasting seasons and weathers and disseminating information with the aid of wireless telegraphy. There would be a *bureau of animal industry* improving the breed of cattle and "studying compositions of butter suitable for hot countries," a *bureau of plant industry* introducing useful fertilising insects and destroying harmful ones, and a *bureau of soils* mapping the soils of the whole Nile Valley. Forestry, of course, would be considered. There would be a *bureau of foreign products*. "Its trained agents will be travelling over the whole world, and forwarding to Egypt from every quarter of the globe, grains and plants which give promise of being useful in the Nile Valley". This bureau would introduce labour-saving machines of every kind, it would study the world's market and instruct the country in profitable and unprofitable crops. Another section of the Agricultural

Department would study pisciculture. Finally, the collection of statistics, essential to the proper distribution and growth of agricultural product would be entrusted to trained experts. •

A *Bureau of Commercial Intelligence* was started in September, 1914. Its chief function, according to the Egyptian Government's Almanac, is to furnish information connected with Egyptian agricultural products for export; and with reference to markets for imported products, the Bureau acts as an intermediary between the producer and consumer. Samples of produce are prepared for submission to enquirers in all parts of the world, and information is supplied to producers to enable them to prepare their produce in a manner suitable for foreign markets.

Cotton *halaqas* or stores have been instituted in various parts of Egypt in order to protect the small landholders from fraud when selling his cotton and are also used as the means of distributing cotton seeds to the small farmers on behalf of the Ministry of Agriculture. •

The example of other countries—specially of all those interested in agriculture—should be carefully studied by us. It is interesting to note how Dutch agriculture, by transferring the potato and turnip from the garden to the field, created a new winter food for men and cattle, a change which made possible the growth of population in Modern Europe “feeding threefold the inhabitants off areas which had barely supported one-third in frequent peril of famine, and contributing more than any other cause to banish leprosy from Christendom.” And in the production of potato the cultivator in Bengal is more favourably situated than the cultivators in most countries.

Before we proceed to outline a comprehensive scheme of agricultural improvement it would be convenient to take account of the crops grown in the districts of Bengal and the total area in acres under each crop. It will at once reveal the relative importance of these crops both as *food* and *for money*, for some of them are money crops and as such are also very important. We will take up some of the money crops first as without them it would not be possible for India to meet the

balance of trade. Before the year 1838, experiments with jute by Dundee spinners on their flax and hemp machinery were not successful and such was their contempt for the fibre that sellers were required to guarantee that their products were "free from Indian Jute". The cultivation of tea had been merely experimental prior to 1838. It was in that year that the first commercial sample of Indian grown tea weighing 488 lbs. was forwarded to England from the Government Gardens in Assam. The first shipment of linseed to England was made in 1835-36 by one Mr. Hodgkinson. All these are the principal money crops grown in Bengal and to-day they are almost as important as food crops. We take the figures for 1933-34 for the various crops :—

Crops.		Total area in 1933-34.	Normal.
FOOD GRAINS			
(1) Rice—			
(a) <i>Bhadoi</i> or <i>aus</i> harvested from mid-June to mid-November		5,775,300	6,085,300
(b) <i>Aman</i> or winter harvested from mid-November to end of February ...		15,498,700	16,442,400
(c) <i>Boro</i> or summer harvested from beginning of March to mid-June ...		398,500	416,300
Total Rice ...		21,672,500	22,944,000
(2) Wheat ...		145,500	160,500
(3) Barley ...		84,800	113,300
(4) Jowar ...		5,900	4,500
(5) Bajra ...		2,300	4,300
(6) Maize ...		77,500	104,500
(7) Gram ...		174,900	305,000
(8) Other food-grains (including pulses and marua) ...		1,016,700	1,304,000
Total food-grains ...		23,180,100	24,940,100

OIL SEEDS

(9) Linseed	...	...	123,800	292,200
(10) Til	...	...	157,900	194,700
(11) Rape & mustard	693,400	892,400
(12) Others	43,600	52,500

Total Oil Seeds	...	10,18,700	1,331,800
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(13) CONDIMENTS & SPICES	...	132,700	190,700
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CROPS GROWN FOR SUGAR.

(14) Sugarcane	256,600	201,100
(15) Others	53,600	54,400

Total sugar crops	...	310,200	255,500
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FIBRES

(16) Cotton	58,100	58,500
(17) Jute	2,142,300	2,310,300
(18) Others	48,300	62,400

	2,242,600	2,431,200
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(19) MULBERRY	15,300	17,500
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BEVERAGE

(20) Tea	199,900	173,000
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DRUGS & NARCOTICS

(21) Tobacco	285,700	293,000
(22) Cinchona	3,100	3,200
(23) Indian Hemp	400	600
(24) Others	700	1,100

Total drugs & narcotics	...	489,800	470,900
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(25) FODDER CROPS	...	100,200	122,600
(26) FRUITS & VEGETABLES including			
root-crops	...	767,200	867,100
(27) MISCELLANEOUS	{ FOOD	236,700	426,200
CROPS	{ NON-FOOD	82,400	124,100
Total area cropped		28,575,900	31,177,700
Area cropped more than			
once	...	4,573,500	4,974,300
		24,002,400	26,203,400

The acreage shows the relative importance of the crops. We also find that among "food grains" wheat, barley, jowar, bajra, and even gram, among "oilseeds" linseed, among "sugar crops" other than sugar cane, among "fibres" cotton, among "drugs and narcotics" cinchona, among "beverage" tea,—are not grown in all the districts, the soil and climatic conditions evidently not being so suitable as to make the produce paying.

This demonstrates the desirability of having a complete soil survey and an examination of the climatic conditions. This is particularly important for Bengal as the density of the population is large and there is not enough cultivable soil for mass production irrespective of the suitability of soil for any particular crop. The Province shall have to adopt intensive cultivation.

Rice (সর্ষপ)		Autumn Rice—	
Winter Rice—		Chittagong	95
Darjeeling	198	Khulna	92
Bogra ..	108	Rajshahi	92
Faridpur	107	Pabna ...	92
Howrah	102	Faridpur	92
Hooghly	95	Rungpur	90
Rungpur	94		

অন্য-সর্ষপের ক্ষেত্র ১৭৬ মণ্ডল, জেলা, ময়ূর, পুন্ড্র

WHEAT			Bakargunj		
Rangpur	...	111	Chittagong	...	100
Rajshahi	...	101			
Bankura	...	100	SUGARCANE		
Birbhum	...	92	Malda	...	498
Burdwan	...	70	Bakerganj	...	182
GRAM			Faridpur	...	169
Birbhum	...	127	Bogra	...	135
Bankura	...	95	Mymensingh	...	120
Howrah	...	83	Rajshahi	...	123
Rangpur	...	73	Rungpur	...	119
LINSEED			Chittagong	...	100
Dinajpur	...	187	JUTE		
Midnapur	...	114	Hooghly	...	119
Chittagong	...	100	24-Pergunnas	...	97
MUSTARD 1932-33.			Rajshahi	...	94
Burdwan	...	100	Murshidabad	...	82
Bankura	...	100	Khulna	...	73
Dinajpur	...	100	Chittagong	...	62
Rangpur	...	25			

Why should not districts concentrate on the cultivation of crops in the yield of which they excel?

Let us take the case of mustard. Bengal has not got more than 11,500 ghanis or pressers; and she depends for a large portion of the supply of mustard oil on other Provinces although the normal yield of mustard per acre in Bengal is higher than in U. P. Bulk for bulk it is always cheaper to send the finished product rather than the raw materials. Mustard oil from the United Provinces, which grow more mustard than they can consume is gradually making its way into the Bengal market with the prospect of placing the oil mills in Bengal in a position of disadvantage. The only remedy that can be successfully applied is to grow more mustard in Bengal—in the districts where it grows well—in preference to crops in which they cannot compete with the sister districts.

The object and ambition of each Province should be to grow its staple crops so as to produce what is needed for its own people, foodstuffs and raw materials for the local industry, and to have an adequate surplus of suitable commodities for export. This means increased and organised output, and, therefore, the problem is how to plan agriculture to achieve this end.

It is evident to any one familiar with the agricultural conditions in India and with the lives of the cultivators that they exist rather than live, and that the margin between starvation and existence is an extremely small one. Any increase that can be obtained from the land should, therefore, go first of all to feed the raiyats and his dependents, but unfortunately in so many cases the increased yield will only go to the village *sowcar*.

That in some cases the yield is not sufficient to meet the requirements of the people will be evident from an examination of the case of rice which is the most important staple crop of Bengal.

Let us take up the case of rice first.

Rice

Bengalees and Madrassese are practically cent per cent rice-eaters while people in some of the other provinces are only partially so. In 1933-34 the estimated outturn of rice in India was 30.35 millions of tons (1932-33, 31.09). But, as Mr. S. A. Latif pointed out:—

“The quantity of rice required at present for the consumption of the rice-eating populations of India was 33 millions of tons. To this must be added the amount of seed required for the purpose of cultivation. Calculating at the rate of 25 lbs. of seed per acre, which is the average of 20 lbs. and 30 lbs. recommended in Mr. N. G. Mukherjee's *Handbook of Agriculture*, the total amount of seed required for cultivating 82.66 millions of acres of paddy land in 1932-33 must have been 920 thousand tons. The total quantity of rice required for use in

India may, therefore, be estimated at 34.00 millions of tons approximately".

Thus there was a clear shortage of rice. And yet India has to export rice to foreign countries, the figures for unhusked rice in 1932-33 being over 1,800,000 tons.

Having obtained these figures we may now limit the scope of our consideration to Bengal only.

Under the Bengal Jail Code the following is the scale according to which rice is supplied daily to each male and female prisoner :—

	Chataks	ozs.
Labouring adult male ...	13	26.747
Non-labouring male ...	9	18.513
Labouring female ...	9	
All prisoners under 16 years ...	9	
Children between 1 year and 1½ years	2	4.114
Children between 1½ years and 2 years	4	8.228

The quantities fixed by the Famine Code are a little different :—

<i>Workers</i>		Chittaks
Diggers ...	...	16
Carriers ...	...	12
Working children ...	...	8
<i>Dependents</i>		
Adult men ...	...	10
Adult women ...	...	8
Children (10-14) ...	...	7
Children (7-10) ...	...	5
Children (under 7) ...	...	4
Children in arms (to mother)	...	3

On the basis of an average calculation we arrive at the conclusion that the requirement of an individual per year is 5 maunds 30 seers. On this basis Bengal requires about 11 million tons of rice per annum, but her production is only 9.6

million tons, a short supply of nearly 2 million tons. A part of this, although a small part,—about 150,000 tons—is exported. The deficit is met by imports from Burma mainly.

No wonder the granary of India is increasingly depending on Burma for rice, while Japanese competition is gaining ground every day and may, before long, assume a threatening attitude unless Bengal is on the alert.

Not only Japan but Australia also is making rapid strides to capture the market. In July last year fifty tons of Australian rice arrived in Britain by the Orient Liner "Otranto" and another cargo of 200 tons followed soon after. It was found that this first shipment of Australian rice was of the Japanese variety from seeds imported into Australia from Japan. Sub-tropical Queensland is naturally suited to rice-growing and the industry has now evidently passed beyond the experimental stage. Previously Australia was a considerable importer of Eastern rice. The position, however, has changed and the Commonwealth now finds itself with a surplus of her own comparatively high grade rice for export. With increasing production in Queensland something like 10,000 tons is a possible figure of Australia's yearly competitive capacity for the English market. Very recently large quantities of rice are being imported into India from Siam and from Indo-China also.

Bengal must make an earnest and sustained effort to increase her yield of rice not only to supply her teeming millions with their chief food cheaply, but also to have a surplus for export purposes to compete in the foreign markets. At least 2 million acres of additional land can be most lucratively put under rice in Bengal. The latest figures given out by the Council of Agricultural Research are interesting in this connection. These figures unmistakably point to the lucrative nature of the crop. They are as follows:—

1	million	acre	under	rice	fetches	...	Rs.	3.4	crores.
1		ditto.		oilseeds		...	"	2.0	"
1		ditto.		wheat		...	"	1.5	"
1		ditto.		cotton		...	"	1.0	"

How is this to be done? That the soil and climatic conditions of the Province are congenial is well known. The average yield of rice per acre in Bengal is higher than in most other provinces, excepting Coorg and certain tracts in Madras and Bombay. But the soil is getting exhausted every year. Fresh lease of life has got to be injected into it, preferably year by year.

What a man gets out of his land depends upon what he puts into it. If in the past the peasantry of the Province could grow fatiguing crop after crop without intermission it was because every year the rich red water of the flood put silt on the land. That is a thing of the past. Land can be enriched either by silt or manure. The results of experiments for twelve years with manure on paddy lands in the Burdwan Farm will enable us to understand the advantages of manure* :—

Nature and quantity of manure applied per acre.	Outturn per acre (Average of 12 years).		Profit per acre. Average of 3 years.			Cost of manure per acre. Average of 3 years.		
	Grain. lbs.	Straw. lbs.	Rs.	A.	P.	Rs.	A.	P.
1. Cowdung (100 mds.)	43,356 3,556	4,479	86	5	0	4	6	0
2. Unmanured ...	1,374	2,174	16	7	0	0	0	0
3. Castor Cake (6 mds.)	3,123	4,628	50	5	0	12	0	0
4. Cowdung (50 mds.) ...	3,461	4,630	58	12	0	2	3	0
5. Unmanured ...	1,492	2,559	18	13	0	0	0	0
6. Bone (3 mds.) ...	3,663	5,124	80	15	0	5	8	2
7. Bone (6 mds.) ...	3,962	5,509	84	10	0	11	0	0
8. Unmanured ...	1,549	2,541	21	5	0	0	0	0
9. Bone (3 mds.) and Saltpetre (30 seers) ...	4,389	6,178	105	0	0	9	4	0

The conclusion to be drawn from these figures is obvious. The utility of manure cannot be over-estimated and it must be used if the yield is to be increased. But it costs the peasants something and cannot be had as a gift, while flood irrigation gives it to him free.

* Report of the Burdwan Farm.

The other thing needful is the use of improved seeds. Speaking of India's "wealth, actual and potential", Lord Ronaldsday unfolded the results of research in Bengal thus:—

"Research produced not long ago two varieties (of rice) giving yields greater by some 250 lbs. per acre than those of the local variety. In 1919 these two varieties were grown on 250,000 acres, with the result that the food supply of this area was increased by 60,000,000 lb. of grain worth £200,000".

"Research on these lines," he said, "is still proceeding and further success in this direction is practically assured. Be it remembered that around the head of the Bay of Bengal alone, lie 20,000,000 acres of productive rice land, and some idea of the ultimate value of these discoveries can be formed".

Information gathered from the Department of Agriculture, Bengal, goes to show that at least eight improved strains of rice are being distributed now and the area under improved varieties is now at least 750,000 acres instead of 250,000 acres.

By the use of improved strains the yield of rice can be considerably increased provided there is 'life' in the land. It has been found that poor soil produces poor crop and necessarily the yield is far from satisfactory. The use of better strains of rice, therefore, must go hand in hand with the use of manure, natural or artificial.

And here it would be necessary to mention the insect-pests that feed on our crops. Though the damage done by these pests is sometimes considered slight, the insects being distributed over large areas, the damage is actually enormous when the loss is calculated as a whole. Indeed, the damage done by the *Rice Hispa*, the *Rice Caseworm*, the *Rice Stemborer*, the *Rice Swarming Caterpillar* and the *Rice Earcutting Caterpillar* though enormous is certainly preventible.

To sum up, we want:—

- (1) increased fertility in the soil ;
- (2) necessary supply of seeds of better strains of rice ;
- (3) prevention of insect-pests which injure the rice crop.

The prevention of insect-pests falls within the sphere of the duties of the Department of Agriculture which should not only conduct researches but also carry on necessary propaganda calculated to educate the peasants on how to protect their crop from the devastating attack of these insects.

The supply of seeds should also be arranged for under the supervision of the Department whose business it should be to encourage reliable cultivators to grow these seeds for purposes of distribution. If necessary, steps are to be taken, and the seed required for the cropped area, would be available in two to three years. Much has been said of one variety,—the *Tndrasail*. But one kind of seed will not be suitable for all parts of Bengal. And it is with the purpose of finding the varieties suitable for the various soils *that a comprehensive and careful soil survey should be undertaken by the Department.*

"It has been observed", writes the Second Economic Botanist to the Government of Bengal in his Annual Report for the year 1932-33, "that the heaviest yielding strain (of deep-water paddies) is not found to stand great depths of water, and secondly, there are some types which have shown better performance records in lower situations than in higher". This demonstrates the desirability and necessity of having different varieties for different places.

We find in the Annual Report of the Deputy Director of Agriculture, Eastern Circle, Dacca, for the year 1932-33, that in order to get a good supply of pure seed paddies, a new system was introduced as an experimental measure during the year, i.e. to work through the Union Boards.

According to this system, in the first year the Department will supply certain quantity of seed paddies both *aus* and *aman*, free of cost, to a Union Board. The President of the Union Board will then distribute this amongst reliable and well-to-do members, on condition of returning after harvest 25 per cent more than the quantity of seeds originally received by them. In the next year, the collected seeds will again be distributed to other members on the same conditions. Thus it is expected that in the course of a few years there will be a good expansion

of Departmental paddies in the tract under the Union Board. When the seeds get mixed up, they will be replaced by pure seeds from the Department in exchange.

The extreme slowness of the process adopted is to be deeply regretted. During the year only two Union Boards were selected in the Mymensing District and only six maunds of *aman* seed paddy—*Bhasamanick* and *Latisal*—were supplied to each of the Boards. We cannot afford to remain satisfied with this "slow toil". Once the soil survey is accomplished the seed suitable for each area should be supplied and extensive propaganda work should be undertaken to whet the desire of the cultivators to use the improved strain seeds. Seed distribution centres should be established and arrangements should be made to solve the problem in two years, a sufficiently long period for the solution of a problem so simple, through Union Boards with which the Province of Bengal is studded.

The Department should make it a point to establish seed distributing *depots* in important centres issuing seed on the easy payment system and making it a condition that it should not be mixed with inferior seeds in use in the locality.

In the matter of the selection of seed it is not enough to discard unripe or worm-eaten grains "withered, thin and blasted with the east-wind". By a judicious selection of seed an early or a late, a hardy or a weak, a bumper or a poor crop can be got. As for the selection of large and well developed grains for seed its importance cannot be over-estimated. As Schrottky has said in his *Principles of Rational Agriculture applied to India*—"Until the first leaves are produced, the plant depends entirely on the nourishment contained in the seed for the formation of the organs which subsequently absorb food from without. The number and strength of these organs will be in exact proportion to the amount of nourishment contained in the seed ; a large, well-developed seed will produce during the course of germination large and vigorous organs, while a poor imperfectly developed seed will not only take much longer time to germinate, but the rootlets and leaves produced will be weak and fewer in number". The difference of growth

will be perceptible in all the further stages of development, and the grain produced will also be of the same nature as the seed.

Thus the importance of the seed demands that the work of producing seed should not be left to Union Board Presidents who have no special knowledge of the work.

The problem of irrigation is not so easy to solve. Comprehensive programmes have to be made after proper level surveys for overflow or flood irrigation. We shall here defer the consideration of this question to a more suitable occasion under irrigation. Needless to say, wherever possible, small irrigation works should be undertaken at once. But till irrigation can be restored or started the use of manure—natural and artificial—should be encouraged. For this also the aid of propaganda cannot be discarded and should be had recourse to. The cultivator should be educated to use green manure and store *dung* and *farm refuse* for manurial purposes. And he should be allowed facilities for securing *manure on easy payment system* from stores. The work of manure supply may conveniently be arranged with the supply of seed. The use of silt from irrigation tanks and reservoirs will not only fertilise the fields but also make the water purer.

Here we will also emphasize the necessity of establishing seasonal husking factories in convenient centres where the cultivator should be encouraged to take his paddy to get it husked. The Department of Industries has introduced improved machinery for the purpose and also introduced improved arrangements for use in big factories. This will supply local labour with employment.

If a comprehensive scheme on the lines indicated above is worked, in five-year Bengal will not only be in a position to produce rice sufficient to meet her own requirements but also to export the surplus which will not be inconsiderable. As stated before about 2 million acres of additional land can be put under rice in Bengal and this area may be distributed over the various districts according to the results of soil and weather survey.

Sugarcane

The importance of sugarcane as a crop is on the increase. It has been recognised that the climatic conditions of Bengal are congenial to the growth of sugarcane—the prolonged and heavy rainfall giving the plant a longer period of growth than in the other provinces. “The grey silt areas usually consist of fairly rich soil capable of producing heavy-yielding crop, provided ordinary care is taken in cultivating the crop.” “Irrigation, usually a fairly expensive business, is generally not required over the major part of the Province, as the rainfall, both in incidence and in amount, is sufficient for the needs of the crop”.

It may seem strange that Bengal, which once produced large quantities of sugar and supplied it, after her requirements were fully met, not only to some other provinces but also to Arabia, Mesopotamia and even Persia, should now depend on foreign countries for the supply of sugar. Even the imposition of a countervailing duty imposed in 1899 did not help the sugar industry in Bengal. The reasons are not far to seek. A new rival was found in jute which gradually invaded the territory of sugarcane cultivation; and the poorness of the indigenous canes made it impossible for the Indian industry to compete with its foreign rivals. The Indian cane, specially that found in Bengal, produced only $\frac{3}{4}$ of a ton of white sugar to the acre, against $3\frac{1}{2}$ to 4 tons produced from Java cane. But the researches and experiments conducted by the late Dr. Barber at Coimbatore have resulted in the production of varieties of cane which make the revival of the industry in Bengal and in some of the other provinces possible. The Bengal Agricultural Department has introduced an excellent variety, of cane in Co. 213 which “is not only rich in purity of juice but also produces a heavy outturn”. This variety, we have been told, having wild sugarcane as one of its parents, grows well in most tracts and can be ratooned for 1 or 2 years successfully. From the Annual Report for 1929-30 of the Superintendent of Agriculture on special duty for sugarcane work, we find that the Co. 213 is

rapidly spreading in different parts of the Province. In the beginning, the raiyats were afraid of the flowering habits of this variety which were considered as a bad omen but they have gradually got over this prejudice. They are now gladly taking to its cultivation. In several districts the low price of jute has given a good impetus to the raiyats for planting Co. 213 canes. Thus the manufacture of sugar on a large scale, direct from canes of this variety, has now become possible in several parts of Bengal. Serious attempts should be made to cultivate more sugarcane in areas especially suitable for its cultivation.

There are compact areas of sugarcane cultivation in several districts in Bengal where up-to-date factories can be established. The Superintendent of Agriculture on special duty in his Annual Report for 1930-31 enumerates those areas thus:—

“Dense sugarcane areas are to be found in Palashbar, Gobindagunge, Mithapukur (Balui), Pirgunge and Badangunge, thanas of Rungpur district; Shibgunge, Joypurhat, Panchbibi and Adamdigh thanas of Bogra district; thanas Bogra, Rajshahi, Badalgachi, Lalpur and Bhagatipara in the Rajshahi district; thanas Bonchagangem, Birgunge, Kshorole, Pirgunge, Phulbari, Nawabgunge and Patnitala in the district of Dinajpur; thana Kalishak in the Malda District; thana Hashenpur, Katiadi, Pakundi, Dewangunge and Phulbaria in the district of Mymensing; thanas Harinakunda and Sailkupa of Jessore; in continuation thanas Pangea in the Faridpur district and thanas of Alamdanga, Gangni Korimpur, Khokea, Kustea and Kumarkhali in the district of Nadia; thanas Beldnga, Kandi and Bhagatpur in the district of Murshidabad; in continuation of Katwa thana in Burdwan; thanas Narsingdi, Kaligunj, Sabhar, Sibpur, Arai-hajar and Munshigunj in the district of Daeca; and Baraset and Basirhat subdivisions of 24-Pergunnahs”.

The yield of raw gur per acre of land under sugarcane in Bengal (4,365 lbs.) is much higher than in most of the provinces—Madras and Bombay excepted.

The cost of cultivation is by no means high. It has been calculated that its cost of cultivation in *char* lands hardly

exceeds Rs. 10 per bigha, as this class of land receives silt deposits every year and requires very little manure. It has been demonstrated by the raiyats in several districts that this cane safely withstands floodwater, both running and stagnant, for several days and it can be grown in the transplanted paddy lands without much deterioration. Moreover, being a deep-rooter, it ratoons very well—a quality which is prized for commercial purposes.

It is to be hoped that further research will evolve even larger varieties of improved sugarcane—more congenial to the conditions of Bengal.

All Government farms now boil their juice in special, McGlashan furnace, except in Rajshahi and Berhampur farms where the Hadi furnace is in use. And the Agricultural Engineer has worked a new type of furnace of his own design in the Dacca farm. The Hadi furnace and Rohilkhand *belo* are also in use in Bengal. The Indian Sugar Committee remarked in 1920 that in Bengal cane appeared likely to remain a scattered crop and it was not probable that a factory industry would develop in the Province. But things have entirely changed now. We have already quoted the Superintendent of Agriculture on special duty for sugarcane work who in the course of his tour has come across considerable areas of compact cane cultivation. He has further observed that the present is the most opportune moment for starting sugar factories in the Province. The possibilities of starting sugar factories in Bengal have also been fully discussed by the Tariff Board in their Report to the Government of India on the Sugar Industry. The heavy protective duties, recently imposed, have further improved those prospects.

There is no reason, therefore, why Bengal should not extend her sugarcane cultivation without delay and establish factories in convenient centres to prepare sugar. Bengal is almost entirely dependent on sugar imported from foreign countries and other provinces. There may be an expansion of acreage under sugar in Bengal by about 3 to 4 lakh acres, but the most

important requirement is the planning of the factories, big and small, for manufacturing sugar.

It is interesting to note that a few sugar factories have already been erected in Bengal on modern lines. But the number is not yet sufficiently large to make the Province self-supporting in the matter of sugar production. It is surprising that the development of the sugar industry in Bengal has been so niggardly although the possibilities of development are so great here. There are, as has been pointed out by Mr. M. P. Gandhi in his recent work on the Indian Sugar Industry, several points in favour of Bengal developing the industry. The following favourable points may be mentioned here :—

- (1) Climate
- (2) Grey silt areas containing rich soil
- (3) Non-requirement of irrigation
- (4) Ability of the Co. 213 to stand water-logging
- (5) Advantage in freight over other provinces.

Like rice and jute, sugarcane has its insect-pests, the more important being the *Sugarcane Top-Borer*, the *Sugarcane Stem-borer* and the *White ant*. Care should be taken to remedy these and save the crop.

Tea

The present year witnesses the centenary of tea production in India. The tea trade actually remained the East India Company's monopoly until 1813, when it was thrown open to any one who cared to take out a license. Lord William Bentinck, at that time the Governor-General of India, having heard rumours of the discovery of the tea plants growing in that portion of Assam which adjoins Burma, wondered if tea could be as profitably grown in India as in China. It was due to his initiative that the Company appointed a Committee to enquire into the possibility of growing tea in Assam, and in that year one Captain Jenkins, a servant of the Company, was deputed to investigate the whole matter. His report was favourable and it was decided to bring plants from China and to establish the industry in an Empire country. "The venture was a failure

largely owing to poor stock and to ignorance of local condition, but this did not put an end to the experiment. Tea was found to be indigenous and from the wild plants of the neighbourhood seedlings were taken and the industry established". The first consignment of Indian tea reached London in 1839 when the experimental plantations were handed over to a company known as the Assam Company.

The romance of tea in India is no less interesting than the romance of jute ; and to-day the production in Assam alone is nearly 250,000,000 pounds a year or more than one quarter of the total world exports of tea, which now amount to about 900,000,000 pounds. In the early stages of the Great War General Joffre was credited with the remark that the "English had 400,000 men in the trenches" and another 400,000 making tea for the first 400,000".

Bengal's share in the industry is by no means negligible ; and its importance for Bengal was fully demonstrated when a depression set in and Bengal was as hard hit as any other province or country. Fortunately, a scheme of restricted production has proved successful.

Of tea we have so long been more anxious to increase our exports than to develop the home market. But the home market is certainly no less important than the foreign market. Only the other day (March 16, 1934) the Governor of Ceylon opened the Ceylon Cocoanut Conference which was convened for the purpose of reviewing the present position of the industry and considering suggestions for its future amelioration. The Governor, in the course of his remarks, described how a similar situation was dealt with when he was in Jamaica. It was realised that the only thing to do was to develop the home market. By the time he left Jamaica, he said, everybody had been converted to the use of cocoanut oil for cooking purposes. The question of soap was also taken up with the result that imports of this commodity were very substantially reduced at the end of the first year.

There is at present a 5-year International Tea Restriction Scheme in operation and India is a party to it. Bengal cannot

certainly expand the area under tea now. But this restriction, an outcome of the depression, may not be continued after the present period. Bengal may conveniently consider the question of expanding the area under the tea when normal times return.

Cotton

At present cotton is not an important crop in Bengal. The area is as follows :—

District.	Area in acres (Normal)
Bankura	1,400
Midnapore	1,100
Mymensing	4,300
Chittagong Hill Tracts ...	52,000
<hr/>	
Total ...	58,800

The major portion of cotton is thus grown in the Chittagong Hill Tracts.

The importance of growing cotton in Bengal was realised during the Great War when His Excellency, the Governor of Bengal, in opening the annual meeting of the Bengal Provincial Agricultural Association on the 4th July, 1918, referred to it as also to the more extensive use of the humble spinning wheel about which we hear so much to-day. After referring to food stuff His Excellency said :—

“Next comes a question which has assumed immense importance owing to the high price of cotton clothes, namely, that of the possibility of profitably growing cotton in Bengal. There is little doubt that one of the causes, if not the main cause, of the high price of cotton, is a shortage in the supply. Anything that can be done to increase the supply will help to ease the situation. Cotton can undoubtedly be grown in some parts of the Presidency where it is not grown at present. But the problem does not end there. It is not much use growing the cotton unless we can also spin it and weave it. If the *Charkha* becomes once more a familiar object in the cottages of Bengal, then I do not see why small amounts of cotton should

not be grown in every village where the soil and climate permit of this being done. And if every villager were to grow a little cotton—amongst his vegetables for example—and if every villager's wife or daughter were to spin the cotton which he grew, it seems to me that we should have gone a considerable way towards solving the problem with which we are faced”.

The proposal contained in the extract quoted above took no notice of the possibility and the necessity of Bengal establishing her own cotton mills and depending as much as possible on cotton grown in the Province itself. It also ignored the significant fact that an organisation or arrangement that meets an emergency with success may be found top-heavy or almost useless when the emergency is over. “Bengal has decided to supply her own demand of cotton textile goods. Already several mills have been established, prominent among them being the Banga Luxmi, the Dhakeswari, the Mohini, the Kessoram and the Bowreah ; some more, like the Basanti, the Bangasri, and one or two others are in course of erection. Others have been registered. We want cotton to be grown as a field crop and experiments must be conducted for the purpose.

Sir George Watt would attribute the present degeneration of the Bengal cotton to neglect. He says :—“The cultivated races of this plant known to exist in India are very numerous and much diversified as to yield and merit of staple. Perhaps the most significant feature of the story of this variety is that while to-day it affords the most inferior grades of Asiatic cottons, at one time it seems to have yielded several superior staples. Of these may be mentioned the much-talked of Dacca cotton”.

The approximate total consumption of cotton piecegoods in Bengal is worth Rs. 14 crores per annum out of which the supply of Bombay, Ahmedabad and other places in India outside Bengal is worth about Rs. 10 crores and the supplies from foreign countries are worth about Rs. 2½ crores. Bengal itself produces only about 1½ crores worth of cotton goods or only 10 per cent. of the demand and for its production has to import raw cotton from other provinces and countries. Experiments

should be made with indigenous varieties of cotton with a view to introducing improvements in these ; other varieties also should be experimented with. In the annual report of the Second Economic Botanist to the Government of Bengal for the year 1932-33, we find the following under cotton :—

“There has been a demand for the cultivation of the crop in the district of Dacca, where some seeds were distributed last year. The demand has come from the actual raiyats. The Dhakeswari Cotton Mill has also been instrumental in creating a demand. The total area under the crop in the farm is not sufficient to meet the demand for seed. As noted in last year’s Annual Report Cambodia No. 2 of the Madras Department of Agriculture secured the highest price in the valuation of the spinning master of the Mill. The *Akola Extra Early* was an early variety but it did not compare favourably with farm type 73 ; 40 ; CF”.

The consumption of Indian Cotton in Bengal amounts to-day to over 105 lakhs of bales per annum and is steadily on the increase. Bengal’s production is about 20,000 bales but the major part of it is not suitable for purpose of cotton piece-goods. Even for producing the raw material at present consumed, Bengal must put over 5 lakh acres under cotton. As stated above, the present production in the Province is about 10 per cent of consumption. Even if Bengal produces half of its requirements, cotton cultivation over 25 million acres would be needed. It is not perhaps known that the yield of cotton per acre is higher in Bengal than in, say, other provinces, Assam and Delhi excepted. Bengal was known to produce fine (long staple) cotton in good old days and there is no reason why it cannot be re-located and rehabilitated now, with the aid of better knowledge of agricultural science. The cultivation of high grade cotton can be very conveniently adopted in Bankura, Midnapore, Birbhum, Murshidabad, Mymensing, Dacca and other centres. Bengal, as other provinces, imports long-staple cotton from outside ; the production of long-staple cotton, therefore in this Province will not affect in any way other provinces. The area under cotton can be immediately increased to 5 lakh

acres and further addition may be made as the local industry develops.

Tobacco

Bengal is one of the principal tobacco producing parts of India because of the suitability of her soil and climatic factors for the cultivation of the plant. The total estimated area under tobacco in Bengal is given as 290,000 acres and the fact that the product, i.e. dried leaf, fetches a fairly high price, places it amongst the most important of the minor crops of the Province. That it finds a ready market cannot be gainsaid, for a rough approximate estimate of expenditure per family on tobacco is Rs. 15 to Rs. 20 per annum.

By far the largest tract growing tobacco lies in the northern part of Rangpur, but practically every other district grows a certain amount of the plant, generally in small patches.

Rangpur has always been noted for its tobacco. Dr. Buchanan's estimate was that Rangpur produced every year tobacco worth Rs. 2,53,280. Since his report the use of tobacco has considerably increased in Bengal as the annual import of cigarettes and cigars will go to show. European companies have found it profitable to establish cigarette factories in Bengal.

Experiments have shown that the major part of the Province is capable of growing good type of both *deshi* and exotic tobaccos. Even Virginia has been grown quite successfully. But the superiority of the leaf depends on "curing" to which special attention should be paid.

The annual report of the Superintendent of Agriculture on special duty on Tobacco for the year 1932-33 does not show what has been or is being done to produce tobacco for cigarettes. But in it we find that the work of cigar making was carried on and the cigars and cigrillos were appreciated. Regarding demonstration we have been told:—

"Demonstration of the superiority of Departmental Motihari was arranged through the District Agricultural Officers practically in all districts In spite of unfavourable weather

conditions, this tobacco has received the universal appreciation of growers of all types as a *hookah* tobacco."

Messrs. Tobacco Industries (India) purchased the varieties grown according to their instructions.

As the superiority of the leaf depends mainly on "curing" it is to be hoped the Department will concentrate more attention on the process of "curing" likely to produce better results and try to make Bengal independent of outside supply of tobacco for the production of cigars and cigarettes.

The "curing" of tobacco can be conducted with the best results only under a dry climate. The natural damp and humid climate of Bengal is not quite suitable for the "curing". But this factor should not stand in the way of the growth of a tobacco industry in the Province. The establishment of air conditioned factories for "curing" tobacco will certainly remove this handicap. The Department of Agriculture should be failing in its duty if it were not to take any interest in promoting the establishment of such factories. The prospects of Empire tobacco have improved under the Ottawa Agreement. By far the greater part of Great Britain's requirements comes from non-Empire countries. India, and particularly Bengal, should make an attempt to get a share of this trade. Of course the quality of the tobacco shall have to be improved considerably before it finds a market in Great Britain.

Groundnut

Of the minor crops which have been recently introduced and which have immense possibilities it only needs to be mentioned that the groundnut is an important one. Experiments by the Department of Agriculture in Bengal show that on suitable soils an outturn of from 12 to 16 maunds per bigha is not an overestimate. In the district of Murshidabad yields of as much as 17 maunds per bigha have been recorded. The cost of cultivation is comparatively low. It requires only one weeding and inter-cultivation. The value of a good crop can be taken at Rs. 50 per bigha (10 maunds at Rs. 5 per maund). This price is not high when we consider that unshelled nuts

sell at 3 to 4 annas per seer or Rs. 7/8 to Rs. 10 a maund retail.

• The crop grows best on high, well drained, sandy soil or on sandy loam and it improves the soil. "It can be used in rotation with jute, and paddy and fodder, or it can replace any one of these crops. It is a good substitute for jute and *aus* paddy. The crop can be grown in most parts of Bengal either as a monsoon or as a *rabi* crop. It is very free from disease.

"The tops of the groundnut make a very valuable fodder and are far more nutritious than any paddy straw or grass. The nut can be used for human consumption either raw or cooked. It can be pressed and the oil used for cooking, hair-oil, soap making or for lubrication. The residue or cake can be given to cattle as food. The oilcake has a very high feeding value. In fact there is no nut known that can be put to so many varieties of uses as *Chinabadam*."

The crop can be grown with profit in the red soils of Suri (Birbhum), Bankura, Midnapore and Dacca and in the sandy soils of Nadia, Murshidabad, Rajshahi, Mymensing and Jalpaiguri. The poverty of the red soils of Birbhum, Bankura, and Midnapore is well known and on them the peasant can hope to grow only poor crops of rice which hardly cover the cost of production. It is of the utmost importance to the raiyats in these areas that they should be given a crop which will pay ; and in groundnut they will find a crop which will give a return of at least Rs. 35 per bigha.

Cultivators in Madras depend on their groundnut crop as a cash or money crop, just as the Bengal cultivator depends on his jute crop to pay his rent, purchase his cloth, etc. It will make even poor land pay and as such its cultivation should be encouraged.

Gram, Pulses, etc.

Gram, Masur, Mung, Kalai, Ararah are some of the food grains used in Bengal. They are cultivated in almost all districts. It may be said generally that when a soil survey has

been made, it would be easily found out which variety could be most profitably grown and in which part of the Province.

In the case of all these the selection of seed is of great importance and it should be the earnest attempt of the Department of Agriculture to conduct research with a view to producing better seeds,—better in yield and better suited to the climatic conditions.

Mustard

Mustard oil is used in cooking all over Bengal where neither lard nor any other oil is used for the purpose. Unfortunately, the quantity of mustard produced in the Province is not sufficient to meet its requirements. This has resulted in :

- (1) other provinces supplying Bengal with mustard,
- (2) the Oil Mill industry in Bengal being on the verge of collapse.

Bengal mills are obliged to use mustard imported into Bengal from other provinces and cannot compete with them because these provinces press their mustard and send oil for sale to Bengal retaining the cake which is extensively used as manure and food for milch cow. Some Bengal mills have introduced improved machinery including expellers. But so long as they will be constrained to depend on the other provinces for the supply of the raw material, they will be the victims of unequal competition. Several districts in Bengal are suited to the cultivation of mustard and they should be induced to concentrate on mustard more than on any other crop. The selection of seed should be carefully done and better seeds introduced and grown. It is necessary that Bengal should not be made to depend on any other province for the supply of mustard which, with ordinary care, she can grow herself to feed her oil-mill industry which even ten years back was flourishing, giving employment to men and women—the latter making the mustard dust free before being put into the crushing machine.

The loss of the cake also is a great loss to the Province as it is profitably used as manure both in India and abroad and, what is of not less importance, as food for cattle.

Linseed

The importance of linseed would be apparent from the fact that it is already grown in Bengal in about 193,500 acres of land.

It is cultivated to produce oil for paints, etc., and is largely exported. The demand for linseed oil in Europe and America is considerable and is likely to increase. The Ottawa Agreement has placed the Indian linseed in a very favourable position in the British market. Exports to Great Britain are already on the increase. Recently the Crop Planning Conference suggested that the acreage under linseed in India should be increased by at least 2 million. The yield per acre in Bengal is the highest of all the provinces and in the fitness of things India should get a decent share of this addition. Its cultivation, therefore, should be sedulously pursued.

In connection with the production of linseed two things should be kept in view :—

(1) The seed should be crushed in Bengal and the oil exported as a finished product. This will keep the cake for use in the Province as manure, as the land wants back the fertility which is lost in producing a crop.

(2) Better seeds should be used to produce better result.

Wheat and Barley

Wheat is largely used in Bengal both by the non-Bengalee population in the Province and by a section of Bengalees specially in the towns.

There are flour mills in the Province which use wheat from the Punjab and from Australia, etc. Parts of Bengal are suitable for its cultivation and proper arrangements for irrigation may give better results. The experiment is worth trying and should be taken up by the Department of Agriculture.

Barley too may be grown from good seed to meet the requirements of the Province.

The economic oracles who tell Bengal that her dependence for wheat and barley on the other Provinces of countries is in strict accordance with economic law, and the Punjab and

Australia have a mission to supply Bengal with wheat and flour, need not be taken as infallible. New crops are always introduced in all advanced countries and often with happy results.

Who can say that parts of Bengal would not be able to compete successfully with the Punjab in the matter of wheat production as Australia is now competing successfully with the Punjab in the Indian market? So long the demand for wheat was negligible Bengal paid almost undivided attention to rice. But conditions have changed and are changing fast. Wheat may in the near future form an important element in the Bengalee's dietary. Thus an experiment with wheat should no longer be neglected.

Minor Crops

There are various minor crops to which the attention of the raiyats can be profitably drawn.

Hemp. A very important agricultural product, whose prospects in India have considerably improved after the Ottawa Agreement and which can be a good substitute crop for jute. Bengal can grow hemp in most of the Eastern Bengal districts and also in Midnapur in the west. The main drawbacks from which the Indian hemp suffers in the world market are the lack of proper cleansing and standardisation. When these defects are removed Bengal hemp can certainly compete with foreign products. At least a lakh of acres can be diverted to this crop.

Medicinal Plants.—Medicinal plants like Nux Vomica, Cinchona, etc., can also be profitably grown in Bengal. The cultivation should be mostly in the form of plantation.

Spices, etc.—No. organised effort has been made to develop the export of commodities like Tamarind, Ginger, etc. Yet these grow in abundance in many parts of Bengal and have export markets.

Root crops.—Onion, Garlic, etc., have also been systematically neglected. Onions and garlicks have large export markets in neighbouring countries like Burma, the Straits, Malay, etc., and with a little more attention a good export trade can be

developed in them. The climate and soil of Bengal permit the cultivation of sago, arrowroot and many other cash crops lucratively.

The rough analysis shows that there is scope for utilising an additional large area in existing and new crops, a rough estimate is as follows :—

1. Under rice	...	...	20 lakhs of acres.
2. „ sugarcane	...	4	„
3. „ cotton	...	5	„
4. „ tobacco	...	1	„
5. Groundnut	...	5	„
6. Rape and mustard seed	...	3	„
7. Linseed	...	4	„
8. Hemp	...	1	„
9. Miscellaneous	...	2	„

Total ... 45 lakhs of acres
or 4½ million acres.

It is not intended to say that measures should be taken to immediately introduce the cultivation of these crops. The above figures only show the possibilities and prospects of new lines and also of existing crops. The right procedure will be to make a detailed study of the soil, climatic condition, labour supply, transport, etc., for each and individual crop and to divide the entire Province into regions suitable for each. When the authorities find that a particular crop is uneconomic due to over-production, either local, as in the case of monopoly products, or universal when the crop is grown in various countries, the raiyats of the locality must be urged to substitute the crop which is most suitable for the place and its production restricted. This will have the additional benefit associated with the rotation of crops.

Further, when new land is reclaimed, the authorities should advise the owners to go in for a crop for which there is scope and the soil is suitable, rather than grow the usual products which may not be economic. The whole point is that the

resources of the Province, in men and material, must be utilised to the best possible advantage.

One example of the above principle may be seen in jute. It is said—although it remains to be established whether the low price of jute is due to over production or defective marketing—that the area under jute should be better restricted. It is necessary in this case to clearly grasp the theory of monopoly price and also to keep in mind that in these days of economic nationalism it is not always possible to get any price for a monopoly commodity. However, admitting that the jute crop is to be restricted, the first duty of the proper authority should be to find out the localities where the jute grown is inferior in quality and yield. The raiyats there are to be told then to substitute other crops that are congenial to the soil and climate and for which relatively better prices are available.

The organisation for the above objective is not very simple. A supreme body of experts is to decide the nature of the agricultural products that are to be needed both for home requirements and export markets. As far as possible, constancy of the crops is to be maintained in each part. When, however, it is decided that a suitable crop should be grown in a particular locality, the raiyats there should be given all facilities (seeds, etc.) and advice for successfully raising it. Otherwise, they will pay little heed to the suggestion.

In the absence of soil analysis and relevant information, it is not possible to show an ideal distribution of the various agricultural crops in the Province. From the available data, however, a map has been added showing roughly the localities where principal crops may be successfully grown.

CHAPTER III

AGRICULTURE—THE BASIC INDUSTRY

(Crops—contd.)

Jute

Jute, the golden fibre of Bengal, is by far the most important cash crop of the Province. In a normal year, it fetches for the raiyats of the producing districts about Rs. 25 to 30 crores while the jute mills employ near $4\frac{1}{2}$ lakhs of people. The part played by this product in the economic life of Bengal may be gauged from the terrible distress prevailing among all sections of the society due to the lower prices realised by the fibre during the last 3 to 4 years. Raiyats and Zaminders, professional people and Mahajans are all suffering alike. The all-round depression in the economic world of Bengal is a sufficient consideration for a detailed study of the subject in all its aspects.

India enjoys a practical monopoly in the production of the jute fibre on a commercial scale. Its importance in times of peace as well as in times of war has been so fully demonstrated that it need not occupy us long. It is almost axiomatic. His Excellency Lord Ronaldshay rightly observed that the series of successive wars beginning from the Franco-German War of 1870 up to the last Great War of 1914 had given to the Bengal industry the position of predominance which it occupies to-day. The importance of India's monopoly of jute was particularly recognised during the last Great War. Modern wars have seen such a great development of trench fighting and aerial activity that sand bags have become almost as essential as actual munitions. Jute from Indian Mills was in great demand not only for the manufacture of these sand bags but also for the provision of coverings for the transport of Army and Civil supplies in the various theatres of the War. As a writer has pointed out in the course of an article contributed to the *Times* in December, 1918, after the conclusion of the Armistice, "the Indian export,

valued during the period at no less than £137,000,000, has comprised, in addition to nearly two million tons of raw jute, 2,823,000,000 bags and 4,693,000 yards of cloth." . . .

The price quoted above was far less than the real price which jute fetched at the time ; for the contract prices entered into between the Calcutta Mills and the War Office in 1915 for the supply of bags for the Allied armies remained unchanged during the intervening three years, although the commercial prices had greatly increased. Attempts were made in the past to grow the plant in French Indo-China, Dutch East Indies, Mexico and some other countries within the tropical zone, but the lack of some indispensable factor invariably stood in the way of successful cultivation of jute. Experiments, therefore, in this direction have now been given up but many of the consuming countries have set about to employ all their talents and resourcefulness to find out substitutes, natural or artificial.

The growing of the plant is confined almost entirely to the Ganges and Brahmaputra Valleys. The soil is admirably suited to the cultivation of the plant and its growth is stimulated by adequate rainfall. A light fall in February, and then moderate showers in March and April, are needed for sowing. A dry weather in the latter half of May and early June is suitable for weeding operations. After that sufficient rainfall is needed for the crop, and also for providing adequate water for steeping and retting, and also for transport of jute in Eastern Bengal Districts to the nearest *hat*.

Adequate labour, particularly manual labour, is indispensable for the cultivation of jute. In view of the small holdings of each individual cultivator it is perhaps not easy to utilise tractors or other machineries for ploughing except in certain events. For weeding, manual labour cannot be dispensed with. Steeping and retting is still a tedious and lengthy process, and it is quite possible that suitably devised hand machine will soon be designed to facilitate the process of removing the fibre from the stalk. No machinery is used by the raiyats in packing the jute for the market. Generally jute is sold by them loose or, in exceptional cases, in drums.

Area under Jute and Outturn.

The area under jute is normally between 20 to 25 lakhs of acres (maximum in 1907-08, 38.8 lakhs of acres, minimum in 1921-22, 15.2 lakhs) ; of this Bengal, including Cooch Behar and Tippera, contributes about 85 per cent, Behar and Orissa including Nepal about 9 per cent and Assam about 6 per cent. These percentages are only approximate and subject to variations according to weather and other conditions. In the Madras Presidency, Bimlipatam Jute is grown.

The average holding of the jute growing raiyats is about 3 acres, of which they usually put one acre under jute.

The highest acreage under jute is Mymensing. The figure in 1933-34 was 566,000 acres out of a total of 2,491,000 in Bengal. Next, in order, is Dacca and then Rangpur, Tippera, Faridpur, etc. The lowest acreage is to be found in Chittagong where the figure does not exceed generally 400 acres. Cooch-Bihar's acreage is about 25,000 and Tippera's about 1,500.

In Behar and Orissa, Purnea contributes by far the largest share, the figure in 1933-34 in that district being 162,200 out of a total of 192,116 in the province. Cuttack with 17,100 acres in 1933-34 comes second. Productions in other districts are unimportant. In Assam, Goalpara, Nowgong, Kamrup, Sylhet and Darrong are the important jute producing districts.

The normal outturn per acre under jute is as follows :—

	Bales of 400 lbs.
Dacca and Chittagong Divisions ...	... 3.7
Rajshahi Division ...	... 3.5
Presidency and Burdwan Divisions ...	... 3.2
Behar and Orissa ...	... 3.3
Assam ...	... 3.5

The above figures are probably under-estimates, particularly those of the Dacca, Chittagong and Rajshahi divisions.

The sowing period extends from March to May. In the early part, sowing takes place in the low lands of Eastern and Northern Bengal. Next come the high lands under the plough.

Last comes the sowing in the Dessi (see below) districts—24-Perganas, Howrah, etc. The outturn depends on the progress of the weather, on other factors controlling the growth of the plant and also on the price of jute prevailing at the time of sowing. If prices remain high, immature plants are frequently cut while low prices often compel the growers to leave the plant in the field as long as possible, which often reduces the quantity of available fibre whose quality also deteriorates. The highest output, 123.8 lakh bales, was obtained in 1926-27 and the lowest 40.6 lakh bales in 1921-22. Harvesting period extends from June to October.

In July, Government publish the preliminary (acreage) forecast for all the jute producing districts. This is collected by District Officers through Union Boards and other officials. Government also publish weekly reports of the crop together with details of weather conditions in the jute districts in the Gazette. The final forecast figures (output) are given out in September. The revised figures of the previous year are also given out at the time. It is a well-known fact that owing to the defective method of collecting primary data, the forecast figures are often far from the actuals and are, therefore, misleading. Great care and precautions are being taken now to improve the data but still the discrepancy between the forecast and actual figures is large. It may be incidentally mentioned here that big jute firms have their own organisations for collecting the figures; invariably these are found to be more correct than official estimates.

Classes of Jute

1. Jat
2. District
3. Deora
4. Northern
5. Deshal and Morang (of Eastern Districts of Behar)
6. Charua and Paharia of Assam
7. Jungli Jute

The Jat quality possesses the finest fibre with strength, gloss, weight and hardness; District Jute has all these qualities

but in lower degrees. Both these classes are grown in Eastern Bengal districts. Deora is also grown in the Dacca Division ; its fibre is also hard but harsh. Northern Jute is soft ; in strength, gloss and weight this is definitely inferior to Jat and District Jute. This quality is principally purchased by foreign consumers outside Dundee. Deshal is harsh and full of sticks. Morang is grown in Nepal Terai. This and the Paharia Jute of Assam are soft and of silky appearance but their supply is small. The Charua Jute is brittle and harsh too. The worst white jute is the Jungli.

The two most important qualities of coloured jute are Tossa and Dessi. Tossa is grown in almost every part of the jute growing area excepting Assam ; in colour, it is red, pink and grey. Its fibre is hard and glossy. The best quality Tossa comes from Eastern districts and is known as bogie jute. Northern Tossa is soft but it possesses all other qualities of bogie jute. Tossa is extensively used for linoleum, carpet, etc. Dessi jute is grown in the South and South-Western districts of Bengal. It has got the colour of Tossa but the fibre is softer. In North-Western Bengal a variety of jute, intermediate between Tossa and Dessi, is grown and is mixed with either of them according to circumstances and the prices ruling.

It is not possible to estimate accurately the percentage of different qualities of jute. The following figures give only approximate outturn :—

A.	White	...	...	75 to 80 per cent.
B.	Coloured	...	...	20 to 25 „
A	(Sub division)			
	(a) Jat	...	...	20 „
	(b) Districts	...	...	20 * „
	(c) Others	...	...	35 „
B	(Sub division)			
	(a) Tossa	...	...	15 to 17 „
	(b) Dessi	...	...	8 to 10 „

The percentages of different qualities (4's, Rejection, L.R., X.L.R., etc.) depend on the season and also on the grading

which formerly used to change every year. A rough approximation is as follows :—

- (i) Fours
- (ii) Rejections
- (iii) L.R.
- (iv) X.L.R.

Use of Jute

The main uses to which jute is put are the following :—

- (i) Hessians and gunnies.
- (ii) Cloth ; as binding thread for carpets and rugs.
- (iii) Jute butts for paper.
- (iv) Cheap upholstery.
- (v) Linoleum.
- (vi) In combination with wool for dress goods.
- (vii) A long and beautiful fibre has been produced which can be spun on the worsted system and is used in serges, vests, sweaters, etc.
- (viii) Canvas, Tarpaulins, etc.
- (ix) As substitute for hemp.
- (x) Other minor uses.

The Indian industry produces mainly sacking and packing materials. Only a couple of mills manufacture canvas, tarpaulins, etc.

Substitute

Jute to-day is suffering competition from textile yarn made of wood pulp (5 to 10 counts). These have sufficient tensile strength and elasticity to be woven into fabrics ; xylodine, sylvaline, licella and texilose (a paper yarn coated with a textile material ; in its latest form it is a paper thread reinforced by a core of flexible yarn) manufactured in Germany and Russia are used for bags and mixed with cotton or linen they may be used for fabrics. These yarns have not the strength of jute but resist better wear and tear and rubbing. As packing substances inside electric cables, these have replaced jute ; these are also used for cement bags. These yarns can be bleached and dyed ;

the strength diminishes when moistened, but water-proofing is possible. In fact, tarpaulins have been manufactured with them. In U. S. A. multi walled paper bags are used for cement ; their price is less than half of the jute bags.

As for the natural substitutes, the West African fibre—Gokra, Ramma, Kowe, etc., are not regarded as serious competitors ; on the other hand Mahotine of Tropical America appears to be gaining favour. This fibre can be obtained by steeping the plant in water for 5 to 8 days. The output is two tons of clear fibre per acre against 0.6 tons of jute. In Caucasus, the Russians are producing fibres—Kendyr, Kenaf, etc.—which are being used as substitutes for Indian white jute. In Belgian Congo, a kind of fibre is used which can compete with white jute.

Jute is inferior to most of the textile fibres. There is lack of durability ; exposed to rain, it deteriorates rapidly ; even in the ordinary course it becomes brittle and loses strength. It can be bleached with great difficulty but it combines directly with basic dye stuffs. In spite of these defects, however, there is no possibility of its being ousted by substitutes in near future, provided the price is kept within reasonable limits.

Nature of Consumption

The local mills are principally buyers of Jat, District and Northern Jute ; they also buy smaller quantities of Tossa and Dessi. Dundee purchases high class jute of all grades and particularly Dessi and Tossa. The Continent of Europe buys white jute of Northern and Western grades and also ordinary quality of Dessi and Tossa. Some continental consumers, manufacturing special products, also buy better quality of all grades, particularly Tossa. Generally speaking Dundee is the buyer of superior stuff ; then come Belgium, Italy, U. S. A. and South America. Other buyers mostly take ordinary jute.

The Indian jute mill industry consists at present of 90 mills with 61,439 looms, 15 per cent of which is now seled under the restriction agreement. These mills are invariably big units and their chief products are hessian cloth and bags and sacking cloth

and bags. Generally speaking the Indian industry has not specialised in the manufacture of finer goods. At the present rate of reduced consumption, the mills use about 50 lakhs of bales (400 lbs. each) a year. In recent times they have been carrying on one year's stock of raw materials.

The foreign industry (principal countries—Germany, Great Britain, France, Italy, etc.) possesses about 45,555 looms. Most of the foreign mills are now working full time and so although the looms of the Indian and foreign industries are in the ratio of 4 : 3, the foreign demand for jute is proportionately larger. Like their Indian compeers they also carry a stock of raw jute, usually six months of their requirements.

The distribution of Jute crop in recent years can be seen from the following table:—

Season.	Actual outturn in lakhs of bales.	Mill con- sumption in lakhs of bales.	Foreign consump- tion in lakhs bales.	Total con- sumption in lakhs of bales.
1912-13	... 99.50	46.00	43.50	* 89.50
1919-20	... 89.50	51.00	30.00	81.00
1923-24	... 87.00	51.00	37.00	88.00
1928-29	... 106.00	59.00	48.00	107.00
1929-30	... 105.00	63.50	47.00	110.00
1930-31	... 108.00	48.00	36.00	84.00
1931-32	... 60.00	45.00	32.00	77.00
1932-33	... 74.00	47.00	35.00	82.00
1933-34 (estimate)	... 79.33	50.00	42.00	92.00

A more detailed table is also given below:—

	1893- 1897	1898- 1902	1903- 1907	1908- 1912	1913- 1917	1918- 1922	1923- 1927	1928- 1932
Acreage in 1000 acres								
acres	... 21.99	19.99	30.93	29.52	28.30	21.33	29.61	26.77
Bales per acre	... 2.6	2.5	2.5	2.5	3.0	2.7	2.9	3.1
Bales in 1000 (of 400 lbs.)	... 58.24	55.02	81.88	79.28	88.19	59.60	88.02	84.64
Exports (July to 30th June), Bales	34.23	32.97	40.71	43.48	29.60	27.52	40.83	38.61
* Indian Mill con- sumption	... 17.46	24.66	33.48	41.50	52.68	50.19	55.28	51.34
Estimated Indian consumption	... 5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00

* This applies only to mills in membership of the Indian Jute Mills Association.

It will be seen from the above table that the prosperity and expansion of the Indian industry date from the Great War. From that period until the present depression the Indian Mills were by far the most important buyers of raw jute. It is only since the depression and the growth of economic nationalism that foreign consumers have been at pains to re-assert their position in the jute market. Notwithstanding all that, the Indian industry holds the dominating position because Indian mills buy the greater percentage of the raw jute and also because they hold disproportionately large stocks and can remain out of the market for a considerable period. Herein lies the key to the problem of jute marketing.

Production of Jute

The different stages in the production and preparation of jute by the growers are fairly well-known. Generally the process entails hard work in which the whole family of the grower participates and often, (when the quantity is large and prices high) necessitates hired labour. It is not possible to accurately calculate the cost of production of jute. If, however, everything is to be done by hired labour the total cost per acre, including the charges for ploughing, will be about Rs. 55 to 60 at the present moment. The yield of jute may be taken at 3.5 bales per acre on the average; in some parts it may be 4 bales and even more. It is equally difficult to say what the fair price for jute should be under the existing circumstances. In the absence of any other occupation during the major part of the year, the raiyat and his family are expected to live on the product of his land and naturally much will depend on the size of his holdings. But considering the present level of prices, the raiyat should not grudge if he gets Rs. 6/- per maund.

Adequate supply of water is indispensable for the preliminaries to the preparation of jute for the market, and in many parts, for its transport to the nearest *hat* or *mokam*. The quality of jute depends to a great extent on the nature of the water. Though it cannot be substantiated, it is said that the

rotting of jute sticks is one of the potent causes of malaria in those parts of Bengal where there is no flow or flushing.

Grades

At present, loose jute is sold in Calcutta, either to mills or to dealers on the basis of four standards, viz., fours, rejections, L.R., X.L.R. So far as the purchase by mills are concerned there is a guarantee of warp and weft yarns to be obtained from jute. In white jute, the seller must guarantee

in 4's	... 90 per cent good sacking warp and 10 per cent weft.		
R's	... 70	Ditto.	30 ditto.
L.R.	... 40	Ditto.	60 ditto.
X.L.R.	... No guarantee.		

In Tossa qualities—the guarantee is the same as in white jute but 10% more of warp. There is no standard in Dessi jute.

There is a standing complaint that during the middle of the season these grades are changed by the Indian Jute Mills Association in collaboration, not officially, with the Calcutta Jute Dealers Association, both mainly European, in the interest of the former without whose support the latter cannot thrive, but to the prejudice of the grower. It is said that the mills begin to buy R, L.R., X.L.R. in the beginning of the season. The dealers get supplies of all these grades. After a time, without notice and in an arbitrary manner the mills entirely stop buying the higher grade and the dealers are compelled to tender their higher quality stock, say, R, against sales of L.R. and X.L.R. at an inconvenient price instead of holding back indefinitely the former, viz., R.

It has already been said that the mills have a dominating position in the loose jute market. They buy mainly *kutch* bales except cuttings and superior quality baled jute such as good white eastern jute, free from *samla*. They cannot buy *pucca* bales from the balers as the charges of bailing come to about Rs. 4 per bale over loose jute. It is true that they get jute free from roots but still the price is higher. Only when the question of storage comes and when the loose jute is not available, they go in for *pucca* bales. The point, however, is that due to the

above mentioned policy of the mills the quality of jute has tended to deteriorate. The percentage of high class jute is much less to-day than what it was several years ago. The raiyats knowing that they will not get good price for high quality jute, prefer to go in for ordinary qualities with larger output.

The grades mentioned above are for sales in Calcutta. In the mofussil hardly any organised system of grading exists. The difficulty is that the output of the individual grower is small and it becomes impossible for the raiyat to sell it direct to the big dealers. He is to rely on the *foriahs* or at the most to go to the nearest *hat*, for the disposal of his product. As for the quality, the raiyat cannot be cheated easily but he generally suffers in the matter of weight particularly when he sells to *foriahs* at his own house.

Marketing of Jute

The marketing of jute falls under three different categories :

- (1) Marketing in the Mofussil.
- (2) Marketing in Calcutta.
- (3) Marketing in foreign countries.

Marketing in Mofussil

Generally speaking, when the jute is ready, the cultivators bring it to the nearest *hat* or stations where buyers are present. Normally they do not thrust their jute on an unwilling buyer. In the interior, the *foriahs* find their way and purchase jute from the cultivators. They often buy as principals or for dealers on commission basis. *Beparis* also do the same, excepting that they are a bit bigger operators and sometimes send their goods to the Calcutta market direct. In normal times a profit of annas four per maund is deemed fairly high by the *foriahs* and *beparis* when they act as principals. As commission agents they are satisfied with anything from one pice to one anna per maund ; they, however, make profits in weights by actually taking more from the raiyats by heavy weights and also by *dhaltas*—allowances at a certain rate per maund.

Most of the dealers in the mofussil have their head offices or *gadis* in Calcutta. These dealers are mostly Marwaris to-day. There are also dealers and *beparis* who have no Calcutta office but who work through agents or *aratdars*. As stated before these dealers in *mokams* buy jute through *foriahs* and also direct from the growers who bring their jute to the *mokams* or *hats*. The system of *dhaltas*—allowances—prevails here too. Long weights are also common. The jute, as it is received in the godowns, is first assorted into various grades of loose jute X.L.R., L.R., etc. These are then packed in bales (*kutchas* bales) of $1\frac{1}{2}$ or $3\frac{1}{2}$ maunds each. Drums of loose jute are not also uncommon, but these are mostly sent by carts or boats. For steamer or railway transport generally $1\frac{1}{2}$ and $3\frac{1}{2}$ maunds bales are packed.

Marketing in Calcutta

Jute from Eastern Bengal districts comes to Calcutta mainly by steamer and barges. There is a "Conference" of the steamer companies; formerly it consisted of three European Groups; only recently an Indian concern has been admitted. Good deal of discrimination prevailed against this Indian concern before it was taken into the Conference; for example, mills would not take delivery of jute if carried on in the steamers and barges of Indian concerns and even the insurance companies would not insure such goods. The Conference fixes the rate of freight which varies slightly according to the season. Owing to the high incidence of freight on the total landing cost in these depression years, jute tended to come to Calcutta by country boats from the Eastern Bengal districts. But as mills would not take delivery from country boats and also because "fire and marine insurance could not easily be effected for country boats, the development was checked, excepting for small quantities from the outlying districts. During the last few years, steamer freights accounted, on the average, for 20 to 30 per cent of the cost of jute landed in Calcutta. Jute from other parts of the country come by railways. Freight is high considering the price of jute; there is

seasonal variation also. A substantial portion of the Dessi jute comes to Calcutta in bullock carts.

The mills generally buy jute on Jute Mills Association form of contracts. Generally transactions commence when sowings take place; these then continue till the end of the season. Formerly, the mills used to make contracts for substantial amounts before arrivals of the new crop in Calcutta and for further large quantities between September and December. At present they buy throughout the year, although the greater part of the purchases falls in the busy period—September–December.

As stated before, the mills buy mostly *kutchha* bales on contracts. With the exception of a very few, the European Mill Managing Agents (by far the greater number of mills are managed by Europeans, although the major portion of the capital is Indian) do not allow Indian brokers to call on them and they purchase their requirements through European Seller's firms which number 5 or 6. The underbrokers are, however, mostly Indians and they gather offers from the sellers while the European Brokers' firms place the contract. These firms enter into undersigned contracts with the Mills and their sellers. They get $1\frac{1}{4}\%$ commission on the contract price and pay only $\frac{1}{4}\%$ to the Indian underbrokers.

The sellers bring jute to the mills according to the contract. Generally, they get advances varying from 75 to 90 per cent of the contract price on the presentation of the Bill of Lading. The balance is adjusted after the jute is taken delivery of and inspected. Sometimes the mills make contract for storage of jute in the mofussil godowns of the seller, to be brought to Calcutta according to requirements.

Disputes regarding the quality, if not amicably settled, are referred to the arbitration of the Bengal Chamber of Commerce. Arbitrators are appointed by the Chamber and their verdict is generally final.

There are various other minor points in this connection. It is said that there is considerable racial discrimination in the trade. The mills are said to grant special facilities to the

European sellers. An interesting development in this connection is that many Indian loose-jute sellers have engaged European and Anglo-Indian supervisors in their *mokams* so as to get preference from the mills for their 'supervised jute', which is classed as intermediate between "European" and "Indian" jute, meaning thereby that the jute has been assorted by Europeans and Indians.

Many balers have their own buying agencies in the up-country. Those who have not such mofussil organisations buy in Calcutta either on contracts or ready, the proportion of the latter being higher than the former. Even those balers who have agencies are often required to buy special qualities which are not available in their stations. Jute, that is not destined for mills and to balers' press houses according to some previous contract or as balers' own purchases, is imported into local marts mainly for balers. There are six such marts in Calcutta at present, viz., Cossipore, Hatkhola, Fulbagan, Ultadingi, Shambazar and Baghbazar. In all these places, excepting the first named centre, there are *arats* where the jute is kept on account of the dealers and the purchasers—the balers and very rarely the mills—go there to buy ready jute. The *aratdary* system in jute is not materially different from the practice in other commodities. At Cossipore, the goods are landed in railway godowns and are kept free of charges for a day; if the goods are not taken delivery of within the day, a demurrage of 3 pies per maund is charged for the next day and one anna per maund for the extra days by the railway. The buyers go to these godowns to make purchase of jute where the brokers sell on behalf of the seller. Importers are naturally anxious to dispose of the goods on the day of the arrival so that they may not incur any demurrage. Such sellers have no godowns of their own in the neighbourhood. Frequently, when they cannot sell, they send the jute to some balers' press house where the prices are settled and the jute sold after inspection. The mart at Cossipur has really become an auction market for jute. In a rising market, there is not much difficulty to sell

but when market is unfavourable the keenness of the sellers has a depressing effect on prices.

•Foreign Marketing of Jute

The jute that enters into the press house of the balers is turned into *pucca* bales. The grades for foreign markets are four for white jute, viz. the Reds, Firsts, Lightnings and Hearts. There are also Tossa Dessi and cuttings and Rejections. There are marks of individual balers in all grades, registered in the Mark Book of the Baled Jute Association. Of these the London Jute Association selects, according to the quality of packing, certain marks which are known as "actuals", others as "substitutes". When delivery is consistently good for a couple of seasons, substitute marks may be elevated to "actuals"; the reverse also takes place in the case of bad deliveries. Actuals generally command a slightly better price than substitutes. The latter also run the risk of a penalty of 25 per cent in addition to the allowance imposed in arbitration for inferiority of quality. In many cases the buyers purchase by individual mark or groups of marks which they have found satisfactory for their use.

In white jute, there are two sub-grades in each grade, viz., 2' and 3' or tops and bottoms. "Assortment" of each grade means equal proportions of tops and bottoms in separate bales. But these are also sold separately. In Tossa and Dessi there are also two more grades 4's and Rejections.

In the balers' press houses, the male and female assorters cut the roots of a *morah* of jute and hackle it to be assorted into different grades according to the length, strength, colour and gloss of jute, into Reds, Firsts, Lightnings and Hearts in the case of white jute. Tossa is treated in the assorting process like white jute. Dessi jute requires no root cutting or hackling. The different grades are hydraulically pressed in bales of 400 lbs. each for export purposes. They are known as baled jute or *pucca* bales. The cost of baling varies from Rs. 3/8/- to Rs. 4/- per bale in the case of white jute. In Dessi it is less.

The whole baled jute trade is conducted under the auspices

of the Baled Jute Association incorporated with the Bengal Chamber of Commerce. All the balers, brokers and shippers must be members of this Association. The majority of the balers are Indian and they pack all grades of jute named above with their own marks or tabs which are registered with the Calcutta Baled Jute Association. The balers have three courses open and they utilise all. They may sell to the "shippers" who have their offices in London from which place jute is sold to all foreign countries. Balers may have their own agents in London for the same purpose. They may also have agents in principal countries of consumption and even have arrangements with foreign mills, although the latter practice is not common. They pay anything from $1\frac{1}{2}$ to 2 per cent. commission to the London Agents and 1 to $1\frac{1}{2}$ per cent. to the continental people. The buyers invariably open credit and the sellers draw the full amount of the invoice.

In recent years, the number of "shippers" has declined considerably. There are hardly any pure shippers to-day; almost all the so-called shippers have their own baling arrangements. Nearly all the balers have their agents at least in London, and they are properly speaking baler-shippers.

At one time it appeared that the whole of the export business would pass into the hands of the Indian balers. A few bad deliveries by some unscrupulous balers, coupled with extensive propaganda against them by vested interests, ruined the prospects; the business is again increasingly passing into the hands of the European balers.

For Dundee, jute is sold mainly on Dundee contract. For the continent, when jute is sold through London, it is under the London Jute Association contract. When, however, the transaction is direct between the baler and the continental agent, the terms of the contract are practically similar to those of the London contract excepting the arbitration clauses.

The arbitration in such cases is expected to be done according to the custom and arrangement that prevail in the port of arrival. Where there is no arrangement for arbitration, amicable settlement or private arbitration takes place.

For Japan and U. S. A. jute is sold according to the terms of the London Jute Association contract with arbitration in London. Many consumers in Northern Europe are increasingly anxious to come in direct touch with the Indian exporters but those of Southern Europe, France and of the two Americas still view the Indian exporters with suspicion.

When the baler sells to a local shipper he is to give what is known in the trade as "Home Guarantee." The "Home Guarantee" is a guarantee to the effect that if there is allowance due to deficiency in quality or condition, the seller in Calcutta shall have to pay the charges. When there is deficiency in quality or condition, the buyers claim allowance. If these disputes are not amicably settled, there is arbitration. If the deficiency exceeds a certain limit the parcels may be invoiced back. It is difficult to justify on principle but it is probable that the Indian sellers will suffer if there be no such guarantee as the shippers in that case will impose exacting terms.

Future Markets or Futkas

There is another market for the disposal of the baled jute known as *Futka* or *Patka* market where dealings only in first grade are conducted for specified periods of delivery. The transaction being for forward delivery, prices are generally higher than ready because of the holding charges, until deliveries are effected ; marginal payments on the outstanding contracts are paid and received on the basis of closing quotation on Saturdays or any other day fixed by the Boards of these markets. The provisions of contracts of these markets are materially different from the Baled Jute Association contract. It is said to be a hedging market for balers who give delivery which are mostly taken up by interest-earning classes, who in their turn sell jute for forward delivery at a premium as hedge against their holdings. Thus the activities of these organisations have proved to be different from those of the ordinary open market. Similar markets used to exist in former days, but in 1927 these were suppressed by Government under the Gambling Act. In the markets that have since appeared there is provision for

delivery of jute against transaction. If this is insisted upon, the element of speculation likely to degenerate into gambling, may be eliminated to a considerable extent. What is required in addition is that not only sellers but *bona fide* buyers also should have the right to operate in these markets. Denuded of the objectionable features which have combined to make people look upon them with suspicion, and converted into open markets, they may prove useful, to some extent, in regulating prices.

Some Suggestions for the Improvement of Production of Jute and its Trade

That the production of and the trade in jute are unsatisfactory is admitted on all hands. The State has pursued a policy of *laissez faire* in this matter. With the growth of economic nationalism everywhere and the consequent need of some form of economic planning in the country, it has become imperative that more attention should be paid to jute, the principal cash crop in the Province. We have already referred to the attempts that are being made in various countries to find substitutes for jute. We have also seen that the possibility of its being ousted by substitutes is not at all serious, provided the price is kept within reasonable limits. Hence, it should be our earnest endeavour to produce it as cheaply as possible. That this can be done has been amply demonstrated. As His Excellency Lord Ronaldshay had pointed out, much painstaking research on the part of the experts of the Agricultural Department involving the scientific examination on Mendelian lines of innumerable varieties followed by cross-breeding, has resulted in the discovery of the varieties of the plant which give an yield much greater than those ever grown by the Indian peasant. A variety of the plant known as *Kakya Bombai*, giving on the average 160 lbs. of fibre more per acre than the local varieties, which had been distributed amongst the villages of Eastern Bengal during the past five years, was being grown on an area of 200,000 acres by 1921. So successful was the crop, that it was estimated that the eventual increase in the yield of the

plant on the jute lands of Bengal might easily amount to 400,000,000 lbs. of fibre worth probably £2,750,000 sterling. Scarcely had this estimate been made when a still more highly productive variety was discovered, giving on the average a yield of 80 lbs. an acre more fibre than *Kakya Bombai*.

The problem, however, is not the increase of yield, for the demand for jute has a limit and we are already suffering from over-production. The problem is to increase the yield per acre by the use of improved seed and to regulate the production and trade of jute. If seeds of the better yielding varieties are used, necessarily the yield per acre will be more, resulting in a lower cost of production and consequent reduction in the sale price, if necessary. If better strain seeds of rice and jute are used, it would be possible to produce the required quantity of the grain and the fibre in a considerably smaller area and release the rest of the land used to be utilised for other crops.

The supply of better seeds should be ensured by the Department of Agriculture which will take necessary steps to get those who offer inferior seeds punished for the offence.

The insect-pests which attack the jute plant are often responsible for extensive damage. The *Jute Scmilooper* and the *Jute Hairy Caterpillar* are the two insects ordinarily found to attack the plants. Care should be taken to destroy them and better still preclude the possibility of their appearing on the fields.

Jute being a monopoly product, the difficulties associated with the regulation of its production and trade are happily less serious than most of the other agricultural products. The first essential requirement in this particular direction is the formation of a Statutory Jute Board, consisting of 3 or 4 salaried members, mainly experts, with an official Chairman, to be in charge of jute from the field to the factory. Its function will be to gather all statistical and other relevant information, both in India and outside, about supply and demand of jute and it should have the power to regulate the crop accordingly. It should also organise research and allied work to improve the quality and to expand the market and the use of jute both in India and in foreign countries. If the establishment of regulated

jute markets be decided upon, this Board shall work in collaboration with the Agricultural and Industries Departments. There should be no difficulty in financing the Board; a small part of the jute export duty may be made available for the maintenance of the Board. If necessary, a small cess on the import of jute into Calcutta and the mills may be imposed for the purpose. If regulated jute markets are established, a portion of their revenue may also be utilised for the purpose.

Crop Regulation

The first duty of the proposed Jute Board should be the regulation of the crop according to the demand. The Board, with the information, data, and stock position in India and outside, should be in a position to form a more or less correct estimate about the requirements of the jute consuming world and then decide upon a figure for the average for the coming season. This the Board must be in a position to enforce. The compulsory enforcement is certainly a difficult task when it is remembered that about 3 million cultivators are engaged in jute cultivation, spread over 3 provinces having small holdings.

To begin with, a voluntary system of crop regulation may be attempted. With the help of the various Government and semi-Government departments and also through public bodies, an extensive propaganda should be carried on throughout the length and breadth of the jute districts and the actual position of supply and demand should be made known to the cultivators. This alone would not suffice. The Jute Board, with the help of the Agricultural Department, must help the raiyats for substitute crops in the land released from jute. It is here that some sort of planning will be needed. The whole agricultural area of the Province should be properly surveyed and the possibilities of growing different kinds of crops in the various areas should be properly studied. In some places cultivation of rice may again be started. In recent years Bengal has been importing moderate quantities of rice from Burma. In Hooghly, Faridpur, Noakhali, Backergunge, Dinajpur and a few other districts

rice cultivation may be re-started in those places where jute has been recently introduced.

The high protection on imported sugar has rejuvenated the sugar industry of the country. Sugar mills are being started in the country. In Bengal, the progress hitherto has been slow, perhaps due to the shyness of the indigenous capital. But a tendency is clear to the effect that small plants manufacturing sugar from gur, will shortly be started all over the Province. If this tendency develop, it is clear that a considerable portion of the present jute acreage can be put to sugarcane in Dacca, Tippera, Backergunge, Rajshahi, Faridpur, Dinajpur and several other districts. Hemp also can, to a small extent, replace jute in certain districts like Faridpur, Dacca, Midnapur, etc. The possibility of hemp cultivation in Bengal has not been properly studied. The prospects of Indian hemp have improved considerably since the Ottawa Agreement. For the same reason, linseed cultivation may also be conveniently adopted in Central and North-Western Bengal. This does not end the list of probable substitute crops in the Province. The provincial cotton industry is expanding but the raw material has to be imported from outside the Province and often from outside the country. Tradition says that Bengal once used to provide fine cotton and there is no reason why in these days of enormously increased scientific knowledge of agriculture, the same cannot be done now in the North-Western part of the Province and in some tracts of Dacca and Mymensing. Then there are good prospects for cultivation of high class tobacco for export. Great Britain still imports large quantities of cigarette and cigar tobacco from non-Empire countries and there is no reason why attempts should not be made to grow that in India.

The main point is that if some form of jute crop regulation is found necessary, the authorities must be in a position to place before the growers the prospects of substitute crops ; otherwise, no amount of propaganda will succeed ; the raiyats have generally small holdings and they will not agree to keep a portion of their land fallow.

If, however, voluntary regulation of crop would not succeed, recourse shall have to be taken to compulsory regulation. The Jute Board shall prepare the scheme, keeping in view the prospective demand of substitute cash crops in the individual districts. The Board will thus say that not more than so much quantity of jute should be produced in the season and then allocate the growers their quotas for different districts, keeping in view the prospects stated above. At the same time, it must be remembered that no resultant good will come by organising artificial scarcity. Jute is the world's sacking and packing material simply because it is cheap. If the prices rise disproportionately substitutes are bound to appear. The theory of monopoly prices should be always kept in mind.

It is quite possible that in spite of forecasts about the possible world demand something may happen after the sowings are over which would reduce the demand. Provided the raiyats get good price for jute for two successive years, they will be in a position to hold the jute ; if, however, there is any possibility of forced selling, the Government, through the Jute Board, should be prepared to hold the surplus jute and have arrangements ready for the purpose. This is being done for commodities in Egypt and U. S. A. through Government agency and there is no reason why this cannot be done in India.

Removal of Abuses

Even at the present moment there are many abuses which should be eradicated without delay. The first requirement is that the *foriahs* and other jute dealers who buy direct from the raiyats should be licensed and their weights tested and marked correct. Further, uniform weights and measures should be introduced throughout the Province. The system of *dhaltas* should also be abolished both in the mofussil and in Calcutta. There should not be any difficulty in introducing these reforms through the various Union Boards and other agencies in the country.

Better Marketing Organisation and Improvement of the Holding Capacity

The main defect of the jute trade is the lack of holding capacity of the raiyats in the absence of any suitable marketing organisation. Raiyats are poor, unorganised, and mostly in debt. Most of them cultivate the land with borrowed funds and also live on them during the period of sowing and harvesting. A substantial part of their land revenues and other dues is to be met during and immediately after the harvesting. The result is that the jute is to be marketed as soon as harvested, almost in a hurry and that irrespective of the price. They cannot hold anything back and so are absolutely at the mercy of the well-organised consumers and capitalists. The demand for the fibre is more or less uniform throughout the year and if only the supply can be regulated according to the demand, better prices are sure to be realised. The low price of jute and the immense resources of the consumers, enable the latter to hold jute for the year's requirements without any difficulty. The most essential requirement, therefore, is to increase the holding capacity of the growers with a view to regulating the supply according to the demand.

Several schemes have been suggested to attain this end ; they are :

- (1) Establishment of licensed warehouses, and credit facilities from the banks.
- (2) Regulated markets.
- (3) Government's intervention.
- (4) Establishment of Co-operative sale societies.

All these schemes have been discussed more or less thoroughly in recent times. In the first, the proposal is to establish licensed warehouses, mainly by private agencies but with assistance, financial, technical and otherwise, from the Government. The whole idea is that when the crop is ready and the grower does not want to sell it immediately, he will go to the licensed warehouse and deposit it agreeing to pay rent, insurance charges, etc. The warehouse authorities will issue a

receipt stating the quantity and approximate quality of the jute that is deposited. The receipt should be accepted by financial institutions as security for an advance—a certain percentage of the market price—to the raiyat, the stipulation being that the margin must be maintained or the financial institution should dispose of the goods. The arrangement is certainly feasible excepting that in view of the small quantities of jute brought by individual growers, the warehouse people should themselves act as financiers. Any separate institution may find it difficult to advance on such small holdings. All relevant information about the jute market may be conveniently posted in such warehouses or the financial institutions, if any.

The second suggestion is to establish 'regulated' markets for jute as in the case with cotton in C. P. and Berar. These markets have proved an immense success in these provinces and their establishment in jute districts has been recommended by the Jute Enquiry Committee. The idea is to have markets established under the general control of a central organisation but managed mostly by local people, each for a definite jute area and to have all sales of jute transacted there. The market managing committee in such cases, will make rules and regulations for the sale, see that abuses do not exist and arrange for storing jute, if necessary, for a certain period on payment of rent. For these services, they may levy a small imposition to cover their expenses. In the ordinary course, such markets will help in removing the abuses, but unless licensed warehouses develop in and around these markets it is difficult to see how the holding capacity can really improve by this measure. The authors of the scheme, however, believe that as soon as such markets are established, warehouses with financial facilities are sure to grow. There is another point in this connection. If the growers are to be given facilities, these markets should be numerous and at a rough computation at least 750 of these will be needed for Bengal alone. The present laws about *hats*, etc., shall have to be modified to compel all jute growers to go to such markets. Still it is believed that the smaller producers will not be directly benefited by these

markets. The *foriahs* and the bigger dealers will certainly find it useful.

Government Intervention

Still there is a third scheme to improve the jute trade organisation. It has been suggested that under the proposed Jute Board, Government should have an agency to buy and stock jute when the price falls below what is regarded as economic price or what the price-level of manufactured goods justifies. A modified scheme is that, instead of buying outright, Government agency should advance to the growers a certain percentage of the ruling market price against deposit of the jute in their godowns. It is obvious that buying outright is not possible if Government have no control over production while the machinery for holding jute by Government may be a difficult and cumbrous process. The supporters of the scheme, however, believe that provided the overproduction is not large in any year, a mere declaration to the effect would be sufficient to keep up the prices. If even then some action be necessary, Government should not experience any difficulty from the standpoint of finance ; a small portion of the jute export duty can be set aside for the service of a loan whose proceeds may be utilised for the purpose. A sum of Rs. 2 to 3 crores according to the supporters of the scheme ought to be more than sufficient for the operation, if at all necessary.

Co-operative Sale Society

The marketing of jute through co-operative organisations was attempted a few years ago but proved a failure because of the lack of managing ability and the absence of business experts in the organisation. Management was too costly and there was hardly any co-operative principle in it. In the latter stage it developed into an ordinary jute concern doing more or less speculative business but without special control. The failure of that organisation should not be regarded as the failure of the application of the co-operative principle in handling jute. The whole idea behind co-operative selling arrangement is

to eliminate the middlemen and to bring the growers, producers and consumers together. In the earlier stages, the charges for management including those for the central organisation in Calcutta will be necessarily high, but with the expansion of the movement and the growth of the number of societies, the incidence of this charge can be materially reduced below what is now taken by the middleman. The organisation of the sale societies should be as follows :—

A sale society is to be established at a big jute centre and the growers are to be enlisted as its members, on their purchase of shares of the society. If the prospective members be not able to find cash for the subscription, equivalent amount of jute may be accepted as the subscription money. The society must have adequate working capital which may be obtained from the Central Co-operative Banks or the Imperial Bank may be induced by the Government to find this capital, if necessary, by some form of guarantee. In any case, provided the concern is run on a sound principle, adequate working capital may not be found wanting. When the members have got their jute ready, they should bring it to the society which would be prepared to take it and pay the members the price ruling in the locality for the particular quality. The central organisation in Calcutta will arrange for its disposal either to the local consumers (mills and balers) or the foreign buyers. To begin, it will be necessary to restrict sales to the local consumers. Provided the outturn is large, it is quite reasonable to expect that this direct sale to the consumers and the elimination of numerous middlemen will result in some net profit after meeting establishment charges. This profit may be distributed among the members in the proportion of their sales. It will be necessary if any such scheme be adopted, to start experimental societies in those places where they were more or less successful last time ; gradually the organisation can be extended to the various parts of the Province and, if thought proper, baling arrangements also can be made for export business. There are several co-operative jute mills in Dundee and on the continent, which would be much too glad to buy direct from the co-operative organisations from this side.

Introduction of Jute Cottage Industries

Even to-day there exists a cottage industry in jute goods in the different parts of the country, particularly in Faridpur, Tippera, Dinajpur, Bogra, and several other districts. Coarse bags mainly for packing cotton are extensively purchased by the Bombay people. Dary or carpets (*Ashan*) and several other kinds of useful goods are the principal products of the industry. The subject has been discussed elsewhere in this volume, but it may be pointed out here that the principal difficulty this industry experiences is in spinning. Unlike cotton, the only source of supply of jute yarns is the mills and it cannot be expected that the latter, with their own weaving arrangements, will sell at prices which may render competition with their own manufactured goods effective. This cottage industry can be put on a sound basis if small spinning units are established in important jute centres by co-operative bodies and the yarns are made available to the weavers. These factories would be seasonal giving employment to people during the months when they remain in a state of forced idleness. With standardised looms, it may not be impossible even to manufacture goods similar to the products of the mills. The growth of an indigenous jute cottage industry may supply many requirements of the Province which are now imported from outside. The consumption demand of jute may also be increased considerably. The weakness of jute lies in the fact that the industry caters principally for foreign markets. Home consumption of jute goods is only a very small proportion of the total production in the country.

Marketing of Jute in Calcutta

Loose-jute :—the most essential requirement in connection with the sale of loose jute is the fixing of the standards by legislation. Naturally, these standards are to be based on guarantees of warp and weft outputs of the jute. Although it is difficult to say whether the local mills can be made to change their policies regarding jute purchase, still it is desirable that the standards should be fixed in consultation with the producers

and consumers. The existing standards are fairly satisfactory provided these can be enforced.

The second improvement necessary is the providing of storing facilities in the Cossipore mart. In the absence of such facilities, the importers are compelled to dispose of the goods practically on the day of the arrival, and, in a subdued market, this forced selling further depresses the price. The railway authorities may take up the work, or private agencies may be induced to build warehouses in and around the station.

The other facilities required by trade are in connection with the transport of jute, particularly from the Eastern Bengal districts. If the price-level of jute do not rise substantially, the existing incidence of freight on the total landing costs in Calcutta will be unreasonably high when jute is brought by railways and steamer companies. Either the freights must be reduced or arrangements should be made for insurance, etc., of country boats carrying jute and, if possible, the acceptance of deliveries in the mills by boats should be arranged. There are obvious difficulties for the mills to take delivery from boats because of the small carrying capacity of each boat, and probably the mills will not agree to it; but still efforts should be made in this direction if railway and steamer freights are not lowered. The railways concerned are State railways. There is no difficulty in their lowering the freights if the Government so choose. The steamer companies, it is well known, fix their freights by arrangement with the railways. So the lowering of freights ought not to present any great difficulty.

Pucca Bales.

A good deal of controversy has been raised in respect of the position and usefulness of the Future Market in the pucca bale section of the jute trade. The matter came to a head when the jute trade on the one hand and supporters of the futures market on the other sent representations and counter-representations to the Government of Bengal, the former demanding its abolition and the latter its retention. The

Government of Bengal admitted the utility of a futures market but at the same time opined that the existing institution needs further improvement. The co-operation of the trade and proper supervision by the Government may help to remove the present abuses in the futures market.

The 'Home Guarantee' clause in the export trade is rather difficult to justify on principle and many people in the trade are of opinion that a system of certifying the quality of jute by some Government organisation, as is the case with hemp in Philippines, should be introduced and the foreign consumers should accept such certificates. The idea is no doubt good but the main difficulty is that foreigners are reluctant to accept such certification from this side, and it must not be forgotten that many years elapsed before the U. S. A. Government could succeed in making the European consumers of U. S. A. cotton accept such an arrangement. The European consumers of jute buy to-day mostly particular mark or marks of each qualities according to their individual requirements. It is doubtful whether they would agree to accept general grading by Government on this side. There is another aspect also of this question. If the certificate system be adopted there will be a little incentive on the part of the good balers to pack well.

Lastly, it has become imperative that there should be special representatives in the important consuming countries to study the nature of the demand for the fibre and to keep the Jute Board in India well informed about the developments in connection with jute industries in those countries. These representatives should be expected further to do propaganda work for introducing and popularising the use of jute in various countries. They may be officers of the Jute Board and attached to the offices of the Indian Trade Commissioners, where such exist, or may have independent establishments. Dundee, Hamburg, Antwerp, Denmark, New York, Santos and Yokohama are the principal places where such offices may be opened in the first stages.

CHAPTER IV

AGRICULTURE—THE BASIC INDUSTRY

(Continued).

Having dealt with most of the important crops of Bengal, we will now turn our attention to other departments of agriculture.

Orcharding

The imports of fruits from other provinces and countries into the Calcutta market are enormous. Our enquiries go to show that the demand for apple in the Calcutta market is met by imports not only from Kashmere and Kulu but also from California and Japan, the imports from California and Japan practically controlling the market. We give below the average monthly imports of apples from California and Japan :—

California

Number of baskets	No. of apples in each basket.	Value of each basket.
800—1000	216	Rs. 11 to Rs. 13

The total value of apples imported from California, therefore, exceeds Rs. 10,000 a month or Rs. 1,20,000 a year.

Japan

Number of baskets	No. of apples in each basket.	Value of each basket.
1000—1200	100—120	Rs. 7 to Rs. 9

The total value of apples imported from Japan, therefore, amounts to about Rs. 10,000 a month or Rs. 1,20,000 a year.

Bengal does not produce apples save in the Himalayan heights but she produces fruits which can be easily exported or used more extensively in the Province.

The United Provinces have realised the importance of orcharding and we are also told that at Japla in Bihar, through

the initiative of the late Mr. Hassan Imam, a band of educated young men have formed a colony of fruit growers. Fruit growing may be regarded as an important system of insurance. Every tree planted matures in five years and goes on paying a substantial bonus for 30 to 40 years and, in some cases, for generations. When the garden is old the tree yields fuel or timber, or both.

An appeal was recently issued by Mr. R. G. Allen, Director of Agriculture, to encourage the United Provinces Fruit Development Board. "I am firmly of opinion", said he, "that there is at present a big and undeveloped home market for fruit in India itself and the immediate need is to secure this market against importation rather than to develop export of fruit from this country." With the aid of figures he has shown that consumption of fruit per capita of population of the United Kingdom has increased from 70·4 lbs. in 1925 to 79·9 lbs. in 1931. Importation of all fruits into the United Kingdom has increased from 25,614,000 cwts. in 1925 to 43,134,000 in 1931. These figures present some of the effects of organisation as directed towards increasing fruit consumption even in a country where the per capita use of fruit was already high. The present consumption of fruit in England is practically 80 lbs. per head and fruit is now regarded a necessity of life. This movement has not come of itself. It is the product of a campaign or series of campaigns carried on by the Fruit Growing Associations—home or overseas—utilising the press, advertisement, the medical profession and the teaching profession in inculcating the value of fruit and making a nation "fruit-minded". It has also been facilitated by better growing and better marketing, materially reducing the price of fruit. At least three of the associations interested have appreciated the fact that India can be made a lucrative market if developed and not being content with the British and European markets they have been steadily developing an Indian market. In order to have an "eat-more-fruit movement" in India Mr. Allen has suggested that the United Provinces Fruit Development Board should so organise the marketing as to reduce the cost to the consumer without

affecting the grower's advancement in profit as arising from the better cultivation and handling of their crops.

But the foreign market need not and should not be neglected. The mango from Bombay was on the market of London for the first time in 1932. It is the richest known source of Vitamin C and is also well supplied with Vitamin A, (the one which is believed to protect against infection). It was sold at 1s. 6d. each in 1932. The second year saw it reach the barrow of the London street seller. And it is hoped that before long it will be a favourite and popular article of delicacy among the British public. The Indian mangosteen was placed in the London market for the third time in 1932. The next year saw the export of pineapple also and the Indian banana to England.

In July last a meeting of prominent landlords and others of the Peshawar District, who were interested in the flotation of a joint stock concern to develop the fruit and grain resources of the Frontier Province on a scientific basis, was held.

While all these attempts are being made in other provinces practically nothing is being done in Bengal where fruit grows so well.

The fertile fields of Bengal are eminently suited for orchards. And in the past it was customary with every well-to-do householder to have his orchard or orchards in which mango, jack, lichee, cocoanut and various other fruit bearing trees were planted in regular rows. Bengal never felt the want of fruits and fuel and timber. Forty or fifty years back for every comfortably placed Bengali family a garden either attached to its residence or away from it was a matter of necessity rather than luxury. Here they grew vegetables which met much of the daily requirements of the family as they drew fish for the same purpose from tanks in the garden and maintained for the purpose of their humble pisciculture. The family looked to its garden for the supply of fruits, and particularly of seasonal fruits.

To-day mangoes are imported into Bengal from Tirhoot, Benares and even from far-off Bombay ; pineapples from Singa-

pore ; plantains from Bombay ; guavas from the Central Provinces and the United Provinces ; though these may be and used to be grown in Bengal. There are some splendid varieties of mangoes in Murshidabad, Maldah, Hooghly, Dinajpur and 24-Perganahs ; plantains and pappas, guavas and the jack can be grown to advantage in most parts of the Province.

Orcharding should be encouraged. Orchards sometimes serve a double purpose. They not only produce fruit and supply timber but are also a form of afforestation so necessary in Bengal and India, specially when the indiscriminate felling of trees in the Province is a growing menace as it reduces rainfall.

Hume in his *Agricultural Reform in India* recommended the planting of trees for the supply of hot-weather forage for the cattle. "There is one thing that can be done—a thing that is entirely in accord with the traditions of the country—a thing that the people would understand and appreciate, and with a little judicious pressure, co-operate in, and that is the planting up with trees of a certain sufficient area in every village in the drier portions of the country. . . . Once a sufficient area planted in each neighbourhood . . . and the cattle difficulty is at an end ; the forest would be closed till other fodder was consumed and the fields were bare, and then they would be opened to the village herds."

Fruit trees afford shelter to the cattle in summer and are actually precious in more than one sense. Bengal can produce the fruits her people can consume and send the surplus to other provinces and also to foreign countries. If plantains from far off Peshawar can be sent to Europe, why not the fruit from Bengal with her two ports—Calcutta and Chittagong?

Here is wealth waiting to be tapped and a beginning should be made at once to produce the desired result in the course of a few years.

The Department of Agriculture in Bengal should no longer neglect this important branch of agriculture but direct its attention towards the development of a fruit growing industry

in the Province. Experimental and demonstration orchards should be established along the lines on which they have been evolved in the various States of Australia. These orchards will surely prove a source of interest to both amateur and commercial fruit growers who may receive therefrom valuable instructions in pruning, training and both the theory and practice of propagation. Orchard Instructors and Inspectors should also be appointed by the Department of Agriculture, as they have been done by the Ministry of Agriculture in South Australia, whose services should always be available to orchardists. They will be required to pay visits of inspection and give instructions as to the improved methods of controlling insect and farm gas pests. Thus fruit growers may receive from them much valuable advice as regards the proper methods of spraying and fumigation. These instructors may also advise them as to the proper ways of packing. Their services may moreover prove valuable to assess values of orchards for the benefit of intending purchasers.

Banana

Talking of fruits, it strikes one that the possibility of Bengal playing a considerable part in supplying bananas to European countries was envisaged following the arrival in London of the first consignment of Indian bananas in March 1933. The shipment which was an experimental one, consisted of 659 crates of seven hands each (a 'hand' averages sixteen bananas). It was reported that the bananas sent compared favourably with those from Jamaica with regard to flavour. And the hope has been expressed that India should soon take a place among the world's banana exporters.

The importance of the trade in banana with the United Kingdom alone would become apparent when we find that the annual import of this fruit from various countries of origin amounts to more than eleven million bunches valued at over five million pounds, i.e. over seven crores of rupees.

The high standing of banana as an article of export is due to several factors: the plant is easily grown and gives an early

return ; it is prolific and a crop can usually be assured ; the fruit travels well in cold storage and arrives in a presentable condition in countries far away from its place of origin ; its easily removeable skin protects the edible portions from contamination during handling ; it can be retailed at a low price and, besides being eaten as a raw fruit, can be used as food in many forms.

That the trade is capable of rapid expansion will be evident from the fact that though only small importations into the United Kingdom were made from Madeira in 1878, and from the Canary Islands in 1882, arrangements for shipments in special steamers were found profitable as far back as 1901.

Apart from the demand that may be created in foreign countries there already exists a considerable demand for the fruit in the large towns of Bengal and specially in Calcutta where large consignments are imported from Southern India and even from Singapore, though consignments from East Bengal, which produces fine fruits, are seldom procurable. As perhaps no tropical plant is easier of cultivation than the banana there is no reason why it should not be cultivated on a large scale with a view (1) to satisfying the demands of the Calcutta market, (2) to exporting it to the neighbouring districts of Orissa where very little is grown, and (3) to exporting to foreign countries.

Pineapple

The demand for pineapples—entire or canned—is almost unlimited in Europe and America. It is strange that Bengal with its congenial soil and climatic conditions has not yet taken to its cultivation seriously. As a matter of fact, in Bengal it is nowhere grown as a field crop. Slips and ratoons are planted in the shade, generally near hedges, and the fruits are gathered when they are hardly ripe. It is a fact that sufficient quantities of the fruit cannot be secured in the Calcutta market to feed the canning industry though it can be grown successfully and profitably within a radius of 100 miles.

Pineapple is cultivated on an extensive scale in Hawaii,

Jamaica and Porto Rico, etc., where proper attention is paid to it with the result that large fruits yielding better pulp are produced. In Florida one finds extensive fields on which pineapple is grown while Porto Rico grows it on thousands of acres of land. Jamaica sends large consignments of the fruits to England.

Reference has already been made to the canning industry. The canning companies can utilise large quantities of pineapple pulp, and if pineapple is grown as a field crop in Bengal, the fruit can be sold at a profit to these companies. The Bengal pineapple is prized for its flavour and the demand for it is likely to exceed that for canned pineapple pulp from Jamaica, Florida and other places.

If pineapple is grown in large areas it can easily supply the raw material for another industry. Fibre is extracted from the leaves in Florida where the threads are woven by hand. The fibre possesses strength for cordage with fineness for textile purposes.

The cultivation of pineapple is likely to ensure an income of Rs. 300 to Rs. 400 per acre.

Calcutta can consume a large quantity of the fruit. It being an important port, arrangements can easily be made to export the entire fruit in the same way as mangoes are being exported from Bombay to England.

The cultivation of the pineapple, specially within easy reach of Calcutta, is sure to prove profitable.

Potato

Potato is an item of importance in the dietary of the Bengalee ; it has become so in course of the last 30 to 40 years. It was not indigenous to India. But it easily adapts itself to almost all conditions of climate and the alluvial soils of Bengal offer excellent opportunities for its cultivation. In fact it has given record yield in parts of Hooghly and Burdwan districts. There is plenty of room for the expansion of potato cultivation in Bengal where the demand for it is constantly increasing. It is profitable too. The cost of cultivation, including the cost

of best seeds and fertilizer, will be about Rs. 225 per acre and the yield of 220 maunds at Rs. 2/4 a maund, will fetch about Rs. 495, leaving a net income of about Rs. 270 per acre. In other words, 6 acres under potato will bring Rs. 1,600 annually as the result of four months' labour.

Potato is largely imported into Bengal from outside ; but there is no reason why this unsatisfactory state of things should be allowed to continue when it can be easily grown, and grown well, in almost all parts of Bengal. If the cry of "back to the soil" is to take any practical effect, our young men should be taught and encouraged to take to the cultivation of crops like potato, tobacco and to vegetable gardening.

Vegetable Gardening

The demand for vegetables—fresh and fully grown—is more than the supply, specially in the towns of Bengal. Previously vegetables were grown by the cultivators in small patches for their own use, the surplus being sold in the local bazars. But the demand having increased methods of cultivation have changed. Now-a-days we often find vegetable gardening in the vicinity of towns, while large quantities of vegetables arrive in the Calcutta market from long distances outside the Province—Bihar taking an important part in the supply.

Any one familiar with the conditions prevailing in the vicinity of Calcutta knows how big gardens, uncared for and unused, can be easily utilised for vegetable cultivation. Arrangements should be made to encourage vegetable gardening within a radius of, say, ten miles of Calcutta. Transport facilities are improving rapidly and it would be profitable to grow vegetables in this area for supply to the Calcutta market. The same arrangement may be made, on a smaller scale, in and about smaller towns in Bengal.

It is no longer a strange sight to find vegetable growers in the neighbourhood of Calcutta making use of motor lorries. With increased product, necessary arrangements for proper and speedy distribution must follow. Various new vegetables

have recently been introduced while many more may be adopted for use. In 1896 the late Mr. Monomohun Ghose delivered an address on "A few Observations on the Social Progress of Bengal during the last thirty years" at a meeting of the National Indian Association, London, in which he said:—

"No food or drink touched by a foreigner could be taken by a Hindoo. These restrictions were of so rigorous a character that in course of time people strongly objected to eat any vegetable not indigenous to the country, but introduced by foreigners. A remarkable instance of this is to be found in the fact that not very long ago Hindoos could not be persuaded to eat potatoes. I am assured that, incredible as it may seem at the present day, my own grandfather, who died in 1817, could not be persuaded to sanction the eating of potatoes by members of his own family. . . . Even now there are Hindoo widows who on the same ground (i.e. introduction by foreigners) object to cauliflowers and cabbages."

The change has been rapid and to-day the field for vegetable cultivation is no longer restricted to a few vegetables, indigenous to the Province. The tomato, the beetroot, the salad, the carrot, all are in great demand and cultivators in the hills send down consignments of these vegetables daily to Calcutta whence they are also distributed to other parts of the Province.

Careful calculation reveals the fact that the supply of vegetables has not been able to keep pace with the rapid increase of population in congested Calcutta which is one of the biggest markets for vegetables in India, if not in the East.

In the hands of the intelligent cultivators studying scientific agriculture and proceeding on scientific methods the indigenous vegetables too are likely to improve and yield more profit than at present. The brinjal and the radish, the gourd and the pumpkin, for instance, are amenable to improvement, and better and more yielding varieties can easily be introduced.

Vegetable gardening can afford employment to intelligent and educated young men, as was the experience of Lord Mayo when he was a young man. Lord Mayo farmed not actually for

a livelihood but as a pastime and might have made a living out of it if he had not been born a Bourke, a descendant of the Elizabethan Burkes. Lord Mayo farmed himself and made enough out of it to enable him to attend Parliament regularly from Easter to the end of the Session and met all his Parliamentary expenses which were even then heavy. "Many a day" he used to say, "have I stood the livelong day in the market selling my beets."

The charge of averseness to manual labour can no longer be levelled against the *bhadralog* classes of Bengal. An interesting paragraph in the Census Report refers to the signs of a change in the attitude of the Bengalees towards manual labour. A not inconsiderable portion of workers in industries is now drawn from educated classes to whom until recently the idea of manual labour would never have occurred.

Such young men would do well to take to vegetable gardening—introducing, wherever possible, new vegetables which can be grown successfully in Bengal; but to the misfortune of the people of the Province, they are now supplied by other provinces.

As the plains afford ample opportunity to produce ordinary vegetables, so in the hills can be grown some special vegetables; these can be grown there earlier or later than in the plains when they fetch better prices.

Cattle Breeding

The necessity for the improvement of the cattle of Bengal cannot be over-estimated. The average Bengal cow is a wretched specimen and is the ultimate produce of the environment which is one of ignorance and neglect. Their rickety frame rouses forlorn hope in one. Mr. Shearer has rightly observed that the quality of the cattle varies inversely with the intensiveness of the cultivation and hence the worst cattle in India are the Bengal cows. It is largely a question of food supply. The cattle in the Province have been consistently starved for several generations and the result is witnessed in the degraded specimen of the present time.

But there are other causes too which cannot be ignored. A Survey and Census of the cattle of Bengal was conducted by Mr. J. R. Blackwood and his report was published in 1915. He summed up the problem in Bengal as one "of producing a type of cow which will be a good milker and a type of bullock which will be best suited for ploughing." He found that there were practically no professional breeders of cattle in Bengal. And the lines on which an improvement of the cattle of the Province seemed to be attainable under existing conditions were the provision of superior bulls and the consequent abolition of the use of immature bulls and the introduction of an improved system of cattle management of which the most essential points would be the provision of a sufficient quantity of milk to young calves, and an economical system of stall feeding by the development of fodder crops. Mr. Blackwood's recommendations for attaining these objects were:—

- (1) the multiplication of farms like the Government farm which was opened at Rungpur in 1913 ;
- (2) the provisions from these farms and from the Garo Hills of suitable bulls in selected areas, the bulls being kept in the immediate charge of Panchayats under the general control of the demonstrators of the Agricultural Department.

The proposal was to provide in these areas a sufficient number of bulls to make it practicable to insist on the castration of all the inferior bulls. Mr. Blackwood admitted that his recommendations involved very large expenditure, but suggested that if Government farms could be run at a profit, private enterprise might be tempted to establish similar farms. He regarded the provision and maintenance of good breeding bulls in selected areas as a proper object of expenditure for the District Boards.

Unfortunately we find in the reports of the Department ~~year after year that the demand for bulls cannot be met.~~ There is a general consensus of opinion that a Bengal animal, if a good one, is much to be preferred for breeding purposes to one which is imported. It stands the climate better, and is much easier to feed, and is not too big for local cows. It should,

therefore, be the policy to produce good Bengal bulls in the farms.

• Mr. Blackwood was of opinion that the improvement of cattle in this Province can be effected in two ways:—

(1) by establishing cattle farms either under Government control or private management for the development of superior milk-yielding cows, draught bullocks and serving bulls ;

(2) by providing superior serving bulls under proper management for village cows in definite areas and by castrating weedy bulls within those areas.

But very little has yet been done to accomplish these ideals. If steps are taken immediately they should certainly bear fruit within ten years.

• Not only has nothing been done to castrate the weedy bulls in selected areas together with the supply of desirable serving animals, to-day we find that scarcely has any propaganda been organised by the Department to convince the cultivators and owners of stock of the utility of having good bulls and the necessity of providing healthy and proper food for cattle. Even the indiscriminate slaughter of prime cows has not been prevented. In Calcutta the number of horned cattle slaughtered annually at the Tangra Slaughter House amount to about 90,000 and at Sonadanga about 10,000. Of these 3,000 cows are said to be prime cows, i.e. cows under seven years of age and fit for breeding. When it is remembered that the best cows from Bihar, and the United Provinces and the Punjab are almost daily brought down to Calcutta, the danger of depleting good stock by this indiscriminate slaughter becomes apparent. No wonder the price of milk in Calcutta is exceptionally high. In Scotland the wholesale price of milk per gallon (5 seers) is about 10 annas, i.e. 2 annas per seer, while in Calcutta it sells at double the price and is not only dear but very inferior as a rule. The adulteration of milk is almost universal while a large proportion of it consumed is contaminated.

• The Rungpur cattle farm was established in 1913 and in twenty years it ought to have been able to effect an improvement

in the cattle of the Province, at least in the cattle of the neighbourhood ; but this is all that we find in the annual report of the farm for the year 1932-33 :—

“The usual programme for the improvement of the breed of cattle was carried on. There has been an increased demand for the improved bulls evolved on the farm. Nine bulls were issued during the year under review. *The supply fell short of the demand* (The italics are ours). The popularity of these bulls is being enhanced gradually. The demand for service by these bulls was very large during the year. It would then appear that the public have started appreciating the service of the improved bulls. A fine herd of cross-bred cows with good milking capacity is being evolved, resulting in an increased production of milk. . . . It is satisfactory to note that the cross-bred cow, Suhasini, has reached more than 4,600 lbs. in her present lactation. She is still giving milk. A heifer—progeny of Ayrshire bull—has calved down recently and is giving 18 lbs. of milk per day.”

The result achieved can hardly be considered satisfactory.

Improvement is best, easiest, and quickest done through the male. And it cannot take many years to produce a sufficient number of good bulls for each district when it is remembered that a bull can sire 80 cows in a year. From the calves born, 40 are likely to be males. If 20 only of these are kept for stud each year, and again the same percentage of the progeny of these 20 are marked for the same purpose we should have, something like the following number year by year :—

1st Year	...	...	...	1 bull.
2nd „	...	...	...	1 „
3rd „	...	...	...	1 „
4th „	...	...	...	21 bulls.
5th „	...	...	...	43 „
6th „	...	...	...	63 „
7th „	...	...	...	420 „
8th „	...	...	...	1,260 „

Allowing for 10 per cent of deaths in eight years, by careful

breeding we would have over 1,000 goods bulls—the progeny of the original one bull.

By using good bulls, in addition to securing good bulls for stud, better bullocks would be produced while the cow will also undergo an improvement and will give an increased yield of milk.

In this field of activity the Government should take the initiative and set an example to the people and should, moreover, educate them. An effort in this direction cannot go unrewarded.

Bengal wants more milk for her inhabitants and better bullocks for agricultural purposes. A beginning should be made at once.

Dairy Farming

For the past two centuries England's gentlemen farmers have taken the lead in stock-breeding. They felt that this leadership was a duty they owed both to the farming community and to the State, and as a result of their efforts stock-breeding has been the mainstay of British agriculture. England has become the stud farm of the world. "Let India's landed aristocracy follow their example". Thus wrote Lord Irwin, Viceroy of India, in ushering into existence a new journal dealing with cattle breeding, dairying, cultivation and storage of fodder crops, animal nutrition and other aspects of animal husbandry. But his words do not seem to have evoked that amount of enthusiasm which they truly deserved.

Needless to say the domestic animal is most important in Bengal and India also, and it is to be regretted that the present state of the dairy industry here is so precarious. Ignorance on the part of the public plays a very prominent part in jeopardising the industry. The main difficulty lies in poor producing animals, unscientific breeding, improper and insufficient feeding, improper management of the young stock and improper handling of milk and its products. In the World's Dairy Congress Mr. William Smith, Imperial Dairy Expert, Kasauli (Punjab), gave a gloomy picture of the situation existing in

India. He pointed out that of all the civilised countries of the world, India was probably the most backward in the development of the dairy industry. At present India, with her 22 cows to each 100 people, produces hardly enough milk to supply even 40 per cent of the population with one pound of milk a day.

Dairying in Bengal, as in other parts of India also, is different from that in other countries. In India the two chief objects in cattle breeding are the production of milk and bullocks, the latter forming the main draught power used on the farm. Neither of these objects can be neglected if the welfare of the country is the main objective. A dual purpose animal that will meet both these needs is required, as specialisation will result in economic loss to the country. The main reason for the present deplorable condition of dairying is the lack of efficiency both of the man and cattle on the farm. "The best means of getting the maximum efficiency of man is through education, but the efficiency of cattle involves some further steps". As was pointed out by Mr. W. H. Harrison, Agricultural Adviser to the Government of India, in order to make up the total efficiency either the number of cattle must be increased, or the low grade individuals must be developed in order to secure the required average efficiency, into high producing animals on the basis of scientific breeding. The first of these two solutions is impracticable under the existing state of affairs, because of the very limited food supply. We must then have recourse to the second.

The following practical steps may be suggested :—

- (1) The organisation and the education of the people interested in this particular line of farming and creating interest in others, specially educated young men with some capital.
- (2) Selection of the best individual cows from the present lot on the merit of production (both of milk and bullocks).
- (3) The mating of these selected cows with pure bred and tried bulls.
- (4) The proper care and feeding of the animals, based on the principle of balanced rations.

(5) The proper management of the growing calves that are expected to be the foundation for the future herd.

(6) The introduction of better methods of economizing foods, for securing the best possible yield of forage crops per acre and the extension of the acreage devoted to the forage crops.

It is generally believed that high grade cows and pure bred bulls will build up the herds, irrespective of other considerations. But this is erroneous. "In order to fix certain desirable characteristics in an individual or group of individuals the art and science of breeding must be accompanied by the art and science of feeding. To neglect either of these important steps will mar the quality of even the highly developed herd and bring failure to the expectant owner."

The waste of cattle in Bengal, especially in the Eastern part of the Province, is criminal. Every year large numbers of bullocks are taken from Central Bengal to the Eastern part for purposes of cultivation in areas which are generally under water during the rains. The cattle are not provided with sheds on raised ground, nor with nourishing food and fodder. The majority of them perish of neglect while those which escape death become debilitated and unfit for work and otherwise disabled. The rudimentary duties of owners of animals are ignored and an economic loss ensues which is appalling.

The first thing necessary in dairy farming is the selection of the animals. For, after all, the cattle are the ultimate product of their environment and by a long process of natural selection a type is evolved most suited to the particular conditions under which they are compelled to live. We have already quoted Mr. Shearer who is strongly of the opinion that the deterioration in the Bengal cows is due to lack of proper and sufficient food.

Not only dearth of food but climatic conditions also are responsible for change in animals. The heavy Montgomery cows, for instance, cannot move about in the pasture in Bengal during June, July, August and about half of September, when the soil is wet and becomes slimy. The best method, therefore,

is to select good Bengal cows and mate them with good Bengal bulls or up-country bulls which are not too big for them nor of a strain of a very dissimilar type but of better quality. "Experience has proved that the cattle and sheep of one part of India will not thrive if moved to another and the sending of bulls of one breed with a view to improving another is fatal and that any attempt at working on these lines is to be condemned. Our object should be to improve each indigenous breed without attempting any violent outcross or the introduction of blood which would be unsuitable for the district and in which no possible chance of permanency can be hoped for."

Experiments carried on in the Rungpur Cattle-breeding Farm established by the Government in 1913 were successful in producing a good breed of or rather in improving the breed of the Bengal animal. It may be recalled that after an exhaustive survey of the cattle of Bengal, Mr. Blackwood recommended the multiplication of farms like the one at Rungpur. But, unfortunately for the Province, even the pioneer farm at Rungpur has been axed on grounds of financial stringency with the result that in the matter of cattle improvement in Bengal the hand of progress has been unnecessarily put back on the dial. In Western, Central and Northern Bengal we have not a single cattle breeding farm for the production of a better breed of cattle as also for setting an example to private breeders of stock. The Live Stock Expert, therefore, is being denied the very minimum opportunity of tackling this important problem.

Mr. Blackwood laid great stress on establishing cattle farms either under Government control or private management for the development of superior milk-yielding cows, draught bullocks and serving bulls. He was of opinion that the question of providing bulls is largely dependent on the question of rearing them at the farms, because, as a rule, they are not bred with an eye to serve as serving bulls. The training of the people in the better management of cattle also is dependent on the establishment of such farms. If a number of such farms are established a fair number of men will be trained in the management of cattle, and they would be able to utilise their

training after their return to the villages. It is a frequent and not unreasonable criticism of any proposal for the improvement of cattle, that it is useless to consider the question of their improvement until the question of their better feeding has been settled. This, it appeared to Mr. Blackwood, was to start at the wrong end. He held that it was generally not worth while to give attention to an animal which was worthless.

The buffalo is to be found in many parts of Bengal and its use is on the increase. It thrives well in most parts of Bengal where there is an abundance of water. The best breed of buffalo is the "Murrah". If the breed is kept pure and improved by careful study, it may be said that the milk of no cattle in the world will surpass it in quantity and quality for butter making. Hence, endeavours should be made to secure pure-bred "Murrah" buffaloes, for they give the heaviest profit and realise the best prices at the sale.

England has warmed herself to the task of developing her dairy farming industry. She has found that it is undeniable that her knowledge alike of dairy practice and dairy science is still far behind that of many of her continental competitors. Yet the value of dairy produce sold off the farms in Great Britain is by no means insignificant, being over £32,493,000 :

Milk	...	...	£15,600,000
Butter	...	...	£11,760,000
Cheese	...	...	£ 5,133,000

Since the last war Great Britain has been paying even more attention to her agriculture and the allied industries. In an agricultural centre like Bengal the importance of the industry of dairy farming cannot be overestimated. Repeated proposals to start a dairy farm under the aegis of the Calcutta Corporation have been turned down for one reason or other and Calcutta and Bengal depend on an insufficient and impure supply of milk and milk products with the result that their price is daily going up placing them beyond the reach of the ordinary householder. In Calcutta particularly the difficulty is keenly felt. Here, except in the case of the well-to-do, children

have to be reared up on an inadequate supply of pure unadulterated milk, undoubtedly the vital and economic foundation of the physical well-being of a nation. The establishment of dairy farms near towns has become a necessity. Situation is of the first importance for the success of the dairy farms, as the demand for milk in congested towns is always greater than the supply ; and stall rent and stall feeding being both expensive it is more convenient to have the dairy farm in the country. Even in countries with a cold climate the risk of getting milk from a distance has to be encountered. Mr. H. L. Puxley has drawn attention to the fact that in Great Britain a large quantity of milk has to take a journey of several hours' duration before it reaches the consumer as it has to be brought from places 100 or even 200 miles away. This, even with precaution, tends to make the article inferior as a food and exposes it to the risk of contamination on the way with disastrous consequence to the health of the consumer. In old times the greater portion of the milk consumed in a district was produced in that very district or in its neighbourhood. The great increase of population in towns has created a large demand for milk and consequently it has to be brought over long distances.

If undesirable changes take place in milk, which is forced to undergo a long journey in a country like Great Britain, the risk of its becoming positively dangerous in the climate of Bengal is greater and is easily understood. Hence, the nearer a dairy is situated to the town the better.

To keep up a dairy it is necessary to maintain a sufficient number of milch animals (cows and buffaloes) to produce a desired quantity of milk. One bull to every 40 or 50 females is indispensable. A cow is generally believed to live up to 20 years and a she-buffalo up to 25.

To ensure a healthy flow of milk from the cattle, suitable housing, wholesome food, pure water at regular intervals and kind treatment are of the greatest importance.

The following points should be attended to in erecting byres for milch cattle :—

- (1) They should always be built on an elevated spot.

(2) The entrance should be on the side opposite to that from which the prevailing wind blows.

(3) Each animal should be allotted a floor space of 4 ft. \times 8 ft. At this rate a byre 200 ft. long and 36 ft. broad can accommodate 100 heads of cattle arranged in two parallel rows with feeding troughs and passage 4 ft. wide in the middle and a lean-to calf-shed along with windward side with its gates opening into the main portion of the byre.

If milk is to be perfectly pure, every thing connected with the dairy and its cattle, viz., the byres, the milking pails, the dairy rooms, the outer premises, the machinery and the utensils in use ought to be kept scrupulously clean. Similar care in respect of cattle and attendants is necessary. Only healthy cows should be admitted into the milking herds. The milkers should themselves be healthy, should be clean in person and should be instructed in the rudiments of hygiene. Before a drop is drawn the flanks and udder of every cow should be wiped with a damp cloth to ensure security against dirt and particles of hairs falling into the milk. If possible, a milk pail should be used fitted with a gauge wire strainer. Dairies in Denmark have been known to provide pails with a double bottom in the lower part of which a mixture of ice and salt is placed in order to cool the milk immediately it is drawn. The first few streams from each teat should be thrown away. The bacteria that are found in milk are mostly congregated near the opening of each teat and, therefore, is washed out by the first milk drawn and should never be allowed entrance into the milk pail. Milking should be carried out quietly, quickly and thoroughly ; only by this means will all the cream or fat in the milk be extracted.

It is desirable that whenever possible the cows should be milked in the open air. However clean and well aired the cow-house may be, it can never approximate to the freshness and purity of the open air. The greatest amount of freedom possible is also desirable for the cows themselves as this will produce a sound digestion and therefore milk of better quality.

All utensils employed in the handling and distribution of

milk should be kept absolutely clean. This should not be taken to mean only that they are to be rinsed out with cold water ; the process should be taken a step further. The utensil should be first rinsed in cold, then washed in boiling water, and lastly, rinsed in cold water once more. Unless cold water is used in the first case the milk adhering to the sides of the vessel would be coagulated by the hot water and the utensil could not be properly cleaned.

As the dairy expert of the Government of South Australia has rightly observed, the three essentials in dairy farming are testing, feeding and breeding from good bulls. These are the factors which will undoubtedly show all dairy producers on the road to profits. The possibilities of increased production, when testing is adopted, are indeed very great. It not only causes owners to discard animals not yielding a profit but also impresses upon them the vital necessity of breeding up better heifers in the farm through the medium of better sires. But its value and importance have not been sufficiently grasped in this country. Facilities for having their cows officially tested (with the scales and Babcock tester) have been provided for the farmers in several Australian States and many young farmers are already evincing a great desire for subjecting their herds to tests. The Department of Agriculture in Bengal should tackle this problem.

Feeding requires great attention. Dairying is largely a question of feed and it matters not how well developed and sweetly bred a cow may be, little or no profit may be made unless an abundant supply of suitable fodder is available for her. Nutritious food and fodder should be supplied at regular intervals and in sufficient quantities. The details of daily ration for good size cows to thrive upon are given below :—

(1) Daily ration for a cow giving milk—

- (a) 3 lbs. bran.
- (b) 2 lbs. chuni or grain.
- (c) 3 lbs. cotton seed (which should be procured).
- (d) 3 lbs. oil-cake ($4\frac{1}{2}$ lbs. where cotton seed is not available).

- (e) 3 ozs. salt.
 - (f) 20 lbs. hay or 40 lbs. green fodder.
- (2) Daily ration for a heifer calved—
for the first time—2½ to 4 years old.
- (a) 2 lbs. bran.
 - (b) 1½ lbs. chuni or grain.
 - (c) 2 lbs. cotton seed.
 - (d) 1 lb. oil-cake (1½ lbs. where cotton seed is not available).
 - (e) 2 ozs. salt.
 - (f) 15 lbs. of hay or 30 lbs. of green fodder.
- (3) Daily ration for a breeding bull—
- (a) 4 lbs. of crushed grain.
 - (b) 4 lbs. bran.
 - (c) 3 lbs. cotton seed.
 - (d) 3 lbs. oil-cake (4½ lbs. where cotton seed is not available).
 - (e) 4 ozs. salt.
 - (f) 30 lbs. of hay or 50 lbs. of green fodder.

Generally, concentrated food consisting of bran, grain, oil-cakes, etc., should be weighed and given to each animal during the process of milking. The amount given should be in proportion to the yield of milk and to the size and condition of the animal. Generally, the daily ration of special food given to animals in milk ought not to be more than two-thirds of the daily yield of milk. For example, if an animal gives 15 lbs. of milk the special food, i.e., bran, grain, oil-cake, etc., should be two-thirds of 15 lbs., i.e. 10 lbs.

Grass is the general food of cattle and its supply must be considered to be of the first importance. For this purpose good pasture is to be secured. If the pasture land is good, 3 acres per animal will be sufficient. The more extensive and fertile the pasture is, the less of fodder grown under irrigation and of concentrated food will have to be given to the animals. Also, it will avoid the necessity of taking the animals out

merely for the sake of exercise. In addition to grazing obtained from pasture lands, it will be necessary to grow fodder crops on arable lands to supplement the supply of grass. If irrigation is resorted to, 25 acres will be sufficient for 100 heads of cattle for this purpose ; otherwise, the area should have to be extended. Where there is plenty of grazing, a good quantity of concentrated food will be served, as 1 lb. of oil-cake and a little of salt will then be sufficient for dry animals, while in the case of animals in milk one-third of full ration will suffice.

The cultivation charges for raising one fodder crop on an acre of land under irrigation would be approximately :—

	Rs.	A.	P.
1. One cattle ...	6	0	0
2. Two harrowings	1	12	0
3. Clod crushing			
4. Sowing and covering seed			
5. Cost of 40 lbs. of seed ...	2	0	0
6. Harvesting and tying bundles	2	8	0
7. Irrigation charges ...	2	8	0
8. Value of manure and cost of spreading ...	4	0	0
9. Land Assessment ...	2	0	0
	<hr/>		
	Rs.	20	12 0

Outturn of green fodder 20,000 lbs. at 400 lbs. per rupee will be Rs. 50.

100 animals will consume 5,000 lbs. of green fodder at 50 lbs. per head per day. If 20,000 lbs. are assumed to be the yield per acre, 100 animals can be kept on one acre for 4 days, i.e. on $7\frac{1}{2}$ acres for one month. At this rate about 50 acres will keep the animals on green fodder throughout the year if two crops are grown in the year. The gain of growing fodder is thus apparent.

All animals, whether milch or dry, should be regularly let out in the morning and evening for grazing or at any rate for

exercise. All calves over three months should also be taken out for grazing.

She-buffaloes should be regularly washed once a day, and if a river or pond is situated close by they would enjoy dip and immersion in the water. A good brushing is all that a cow needs, with the exception of the udder and flanks which are particularly liable to become dirty. Washing a cow all over with cold water may give her a chill and diminish her milk yield.

When the animals are taken out, the byres, feeding troughs and gutters should be well cleansed, the gutters being flushed with water. The contents of the gutter should be led into a manure pit and the litter cow-dung, etc., should be spread evenly on it.

After the animals return in the evening, they should be groomed with a coir brush.

No bulls, except the breeding bulls, should be allowed to mix with the milch cattle.

The stud bulls may at times be given light work, such as carting hay or manure and the like. Want of exercise often impairs their fecundity.

Cows should be fed well. One month before calving they should get, besides hay or other rough fodder, 6 to 8 lbs. of concentrated food daily. Just after parturition the cows should have laxative food for 6 days, consisting of boiled rice or *khesari* and wheat bran with a little salt. All animals in milk require a diet that is somewhat laxative.

Calves are a great asset and should be carefully attended to.

Fodder for cattle

The problem of fodder supply for cattle in Bengal is of so great importance that a separate section devoted to it may not be considered inappropriate. The more extensive growing of fodder crops on modern lines is necessary not only to improve the position of dairy cows but also for maintaining good cattle for agricultural purposes and for the drawing of carts. But this problem has been neglected though the encroachment on

fallow land which has been rapidly increasing adding to its complexity. The deterioration of the Bengal breed of cows, as we have already pointed out, is due, among other causes, to want of sufficient food. The cattle are under-fed and starved. "It is due to the stock-owners not growing fodder that thousands of bullocks, cows and buffaloes have to be imported from Bihar and the Punjab into Bengal every year. These animals are necessary for draft and for supplying milk to the people in the cities".

But the climate of Bengal is better suited to the growing of fodder than that of any other province.

Various grasses have been grown successfully in Bengal as fodder ; but the best results have been obtained from the Napier grass or the Elephanta grass, as it is generally called. This grass, which was introduced into Bengal in 1927 from Ceylon, when grown under favourable conditions produces the heaviest outturn per acre of any other fodder known anywhere in India. "It can be grown in small plots, around the sides of tanks, around houses, or on a large scale. It is suitable for the owner of one cow or the owner of fifty. If irrigated, it grows all the year round and the surplus grass can be made into silage, for the period when grass is scarce". In Calcutta there ought to be a large demand for this fodder because stall-feeding is necessarily the practice in Calcutta. As long as proper arrangements are not made for the supply of milk from distant areas—arrangements which cannot be completed without the help and co-operation of the railway authorities, the milkmen and the middlemen acting in concert—so long will milch cattle be stall-fed in Calcutta. Being perennial, the Napier grass does not require replanting every year. The grass planted at the Dacca Agricultural Farm in 1928 was healthy in 1933. It looks like and is planted like the sugarcane. If allowed to grow without cutting, it attains a height of over 10 feet. But the best height to cut it is between 2 and 3 feet when the plant is soft and succulent and is eaten by stock without waste.

The question of both growing and storing fodder has been

engaging the attention of the Department of Agriculture. Promising fodder has been introduced and methods of storing them in the dry state and as ensilage have been adopted on Government farms. An interesting article on the fodder problem was written by Mr. D. Clouston from which the following is extracted :—

“It has been definitely proved that good palatable ensilage can be made from coarse grasses, weeds and other herbage which, in most parts of India, are available in considerable quantities towards the end of the rains. . . . There are definite types of silos in use on Government farms in India but they may be divided roughly into two classes, viz. (1) pucca and (2) kutcha silos. The former are, perhaps, too expensive except for the well-to-do landowner. The kutcha silos, on the other hand, which consist merely of a pit in which the fodder is stored in the green stage and covered with a thick layer of earth, cost very little and are well within the means of the ordinary raiyat.”

At the Imperial Cattle-breeding Farm at Karnal pits dug in the heavy alluvium soil and filled four years before with green jawar were opened and the ensilage was found perfectly sweet and good. By adopting this method the stock-owner would be able to provide his cattle with a luscious food in the dry weather when the grazing areas are parched and bare.)

With the development of the dairy and cattle-breeding industries, the demand for fodder is sure to grow.

Efforts are being made to improve the local breeds of cattle by selective breeding and cross-breeding. It is everywhere felt, however, that any improvement of our breeds must be preceded by an improvement of the fodder supply ; for, in the realm of animal husbandry better feeding is just as important a factor as better breeding. Mr. Howard in his *Crop Production in India* writes :—“In India straw and dried grass takes the place of hay. It is here that improvements are desirable, as these fodders are of low feeding value and do little more than maintain the animals”.

In parts of Bengal at least paddy cultivation need not

rule out pasture. The irrigated Lombardy plain has been known for two thousand years as the great mother of food crops where they have bullocks strong to the plough and know how they should be fed "not only on wild grass and willow leaves and sedge of the swamp, but pick also for them corn sown by the hand". In North Italy, a country with many of the characteristics of Bengal, they still keep hardy bullocks and cows which yield large quantities of milk. The cultivators sow fodder crops for the cattle and devote half their land by rotation to pasture for them. The soil and climate of Lombardy are not superior or even equal to those of Bengal for paddy growing. The season there when it is hot enough is so short that it is with difficulty that the cultivator can scramble out one crop a year. But what are the figures for the yield? The official figure of the average yield in North Italy is nearly two tons per acre, while the official figure for Bengal is well below 1,500 lbs. an acre. Where one million acres are under paddy, if we reduce the average to 400,000 acres taken in rotation and manured properly (preferably by flood or over-flow irrigation) as they do in Italy, and get a yield of 4,000 lbs. an acre instead of 1,500, the 400,000 acres would yield more than the million acres do now, and we would have in hand 600,000 acres on which to raise crops of fodder and grass for cattle or wheat or maize or other crops for men.

The question naturally arises how do we improve the quality and quantity of one fodder crop with a view to putting it beyond the pale of a problem. There is a talk of jute restriction in the Province of Bengal. The restriction may be in area of cultivation because of the introduction of improved varieties capable of producing more jute on less land being used. In this event a large quantity of land will be released. Similar experience will naturally be gained with regard to land under paddy cultivation. On the other hand, lack of pasture has always been emphasised by our public men familiar with rural conditions. A suggestion may, therefore, be ventured that the Agricultural Department should have a well-laid out plan of rotational farming in connection

with lands released as a result of improved jute and paddy cultivation. "Human" crops no doubt are necessary, but crops for those who enable human beings to be built up are not less important in the economy of nature. We learn from the experience of Italy that rotation paddy fields are more productive than the stable paddy-fields, and, if in the case of Bengal it is found true the peasant will, after a few years, adjust himself to the novelty. This is a matter which demands the serious attention of both the Government and the public. But the fact remains that great attention should be paid to the production of fodder for the cattle.

Poultry Farming

The importance of poultry farming in the economic life of the people of the Province has not yet been fully realised nor has proper attention been directed to it. The industry has been left to ignorant people who never consider it worth attending to. But there are exceptional facilities in the Province for a large extension of poultry keeping, as we have in Bengal an abundance of cheap and plentiful grains, and land is available almost everywhere. The country also possesses the finest blood in the world as regards poultry, though the indigenous breeds have deteriorated because of several causes, such as lack of selection in breeding, prevalence of promiscuous interbreeding of stock, and the poverty of the peasantry keeping the fowls, resulting in underfeeding and consequent lack of development of the birds. But the indigenous hen has inherited a vigorous constitution and with proper care can easily produce a superior breed of birds.

That there is money in poultry farming goes without saying. This is mainly because not only is the demand for eggs in Bengal itself great, but what is more, an export trade in eggs may be built up. This export trade, if properly organised, would bring many lakhs of rupees annually. Eggs can be exported either as eggs or in the form of dessicated powder. An enormous market exists to-day in the Western world. Great Britain alone buys annually eggs worth eighteen

million pounds, of this three million pounds being spent on Chinese eggs. A large proportion of the eggs is sent across the seas from distant countries in the form of egg powder. Germany and Belgium are large buyers of this form of egg powder ; but the demand is universal. There is no reason why Bengal should not secure a part of this trade with Europe and America. It is suggested here that the Department of Agriculture should encourage the establishment of cool stores on co-operative lines for storing eggs just as they have been done in England and the United States.

The first requisite is the improvement of egg production. It is a mistake to suppose that poultry farming means owning a few birds and giving them some grain, morning and evening.

As poultry breeds with great rapidity and even women and children can assist in the work, the initial cost need not be prohibitive. A man need have sufficient capital to keep him going for a year while building up the business. He can start a small farm—situated conveniently for the disposal of the eggs and the fowls with Rs. 500 and increase the business gradually with acquired experience.

The ordinary *deshi* fowls are scarcely worth keeping by themselves. Their only advantage—and it is not to be overlooked—is that they are hardy and stand the climate well while imported birds require special attention and care.

The best course is to get six young *deshi* hens and mate them to some pure-bred cock between October and March. Experience shows that the best breeds from which to select the male are White Leghorns, Rhode Island Reds or Minorcas. If possible, one should get the male bird bred from a good laying strain. A good bird will cost about Rs. 15 and it is worth having.

It will be found that *deshi* hens mated to this cock will give pullets which will lay double and triple the number of eggs that their mothers did and the size of the eggs will improve. "The pullets produced by the first mating", says Mrs. A. K. Fawkes after extensive study, "are bred back to their father or to some other pure-bred male of the same breed,

from a good laying strain, and their progeny are treated in a similar manner. Each repetition of this process further improves the number and size of the eggs and brings the birds more true to one type ; at the same time you will have hardy birds inheriting the immunity to tropical diseases from their mothers and high production from their father."

The owner of the birds must know how to house and feed them and also how to treat them when they fall ill.

As fowls are kept for eggs the right sort of food should be given them to produce eggs. Besides food for the support of her own body, she wants an extra amount to be converted into eggs. But care should be taken to see that the fodder does not make the hen fat and lazy and give up laying.

With the increase in the number of fowls the use of the incubator will be found much more profitable than to let the hens sit which will mean less eggs produced by them.

If poultry farming is intelligently developed, poultry will keep their owners. The breeding of good stock will not only benefit the owner, but will also benefit the neighbourhood by demonstrating better methods of poultry farming and raising it to the level of a specialised industry such as it is in Europe and America.

The industry is sure to add to the wealth of Bengal and provide occupation for hundreds of our young men.

In Bengal which is well watered, duck farming is also recommended. Their eggs are specially valuable for the manufacture of dried albumen which is now imported into India from Germany and other European countries and is expensive on that account. Ducks are easy to keep and do not require extra attention.

The turkey and the guineafowl are also easily bred. The turkey is not only the largest of the wholly or partially domesticated gallinaceous birds, but it ranks next to the common domestic fowl in point of usefulness and economic importance, as regards the genus to which it belongs. The turkey, in the act of eating, destroys much life that would, by its existence,

be harmful to the crops and is thus a source of benefit and service to the farmer.

Geese and Swans too are used for utility purposes.

An example from Palestine

A most notable movement that the world has witnessed for a century is the progress in Palestine—involving nothing less than the regeneration of the ancient land and its restoration to its old-time prosperity. Its agriculture means farming the desert. The High Commissioner's Report to the League of Nations Mandates Commission last year was very encouraging. The Government have set up stud and agricultural stations, and in 1932 two others were established at Goga and Faradi. From these stations seed, eggs, and fruit trees are distributed to the newly established farms. In addition, agricultural co-operative societies are being formed among the farmers, and in order to encourage the children in the land, school gardens are being made and school masters are being trained at Tulkaram Agricultural College to make them efficient in the subject.

The improvement that has been achieved during the last twelve years is wonderful and promises a future for the country more prosperous than had ever been hoped for.

Cannot Bengal do what Palestine has done?

Modern methods

That modern methods of cultivation are economical goes without saying ; but are those practical in Bengal at the present time? The idea of mechanical cultivation is often ruled out on the ground of small holdings. But if it pays, there is no reason why mechanical cultivation should not be carried out by Co-operative Cultivation Societies in the case of those cultivators whose lands are not sufficiently extensive to justify the individual purchase of power units. Moreover it is to be hoped that agriculture will now attract educated young men with a fair or at least a modest amount of capital who will do better than the ignorant cultivator whose mind is as narrow as the

plot he cultivates and who lives in constant dread of the money-lender. For waste land and land fallow through growth of deep-seated weeds and other causes mechanical means of cultivation offer the most effective method of opening up the land and this type of work will have to be undertaken in various parts of Bengal where deserted villages have become the rule and not the exception. It has been found that suitable plant for general farming operations can be purchased for about Rs. 3,000/-. "At an experiment carried out in South India it has been proved successfully that the cost of such implements for general cultivation purposes is very much cheaper than bullock methods. For example, in wheat cultivation at Kundool near Hubli, two separate operations, one of ploughing and the second of ploughing, harrowing and sowing were carried out at a total cost of Rs. 6: the estimated cost of similar operations by bullocks was Rs. 16 per acre. The cost of tractor ploughing was, therefore, nearly one-third below that of Bullock ploughing and in addition, the crop yields from the tractor-ploughed lands were very much greater than from bullock-ploughed lands."

The value and the economics of mechanical cultivation in India are still a little-known subject and the prevalent notion that has to be dispelled is that tractors are only suitable for vast areas, and cannot be used economically for general farm work.

The introduction of mechanical cultivation, therefore, deserves serious consideration and implements suited to the needs of the soil of Bengal and to the purse of the average cultivator may be contrived, and, if necessary, experiments may be carried on by competent mechanics and others. In other words, as the Americans say, "we must work hard finding out how to avoid work."

That mechanical cultivation, like everything else, has its dangers and drawbacks is easily demonstrated. Even labour-saving machinery may be overdone. The extent to which it is now carried in American farming, for instance, borders on exaggeration. Implement-makers are busy all the time investing in novelties and improvements. Each season brings with it

new styles of ploughs, reapers, threshers, etc. Farmers buy them all, as they come along, and as a rule the machines are badly cared for when not in use, as it is taken for granted that long before they can be worn out something better will be in the market. But throwing aside expensive implements because they are a little out of date is wasteful and the American farmer can afford to do it only so long as he gets a high price for his produce.

But in Bengal the modest means of the cultivator alone will place a check on any inclination towards extravagance and that is a safeguard against what may prove disastrous.

Easy Payment System

The use of the appliances brings us to the question of the cultivator's capacity to procure them. Even when the cultivator is above that condition, in which, according to His Excellency the Governor of Bengal, "he is groaning under a load of debt, eking out a narrow and penurious existence", he will find it difficult to procure the appliances by paying cash against delivery. How then is he to procure the implements? Here the Co-operative Cultivation or Agricultural Societies come in. We have already had occasion to refer to depots for the distribution of seeds and the supply of manure. A Society can easily discharge the triple function of supplying seeds, machinery and manure.

The Co-operative system has been tried in Bengal now for some time, and some defects in the existing movement and in the existing system have become apparent. The movement has continued to be predominantly 'credit' in character. But the record of purchase and sale societies and of societies for the supply of seeds is far from encouraging. When it is apparent that improved appliances have to be used it should become clear that such societies must be established. It will certainly be necessary, specially in the beginning, for the Government to finance to some extent and undertake the supervision of these societies till they can manage to fall back on their own resources in men and money.

Supply Societies have been an important part of the German Agricultural Credit and German Agricultural Co-operative movement. The Supply Societies confine themselves almost exclusively to supplying their members with fertilisers, feeding stuffs, seeds, agricultural implements and machinery and other miscellaneous articles. Only in rare cases do they extend their business to include groceries, etc. Considerable benefits have accrued to German farmers through combination for the purpose of agricultural requirements. In the first place, the commodities supplied by their Co-operative Societies are of good quality. Manure, seeds, etc., sold by ordinary dealers are not usually guaranteed to contain those constituents in that proportion which make them valuable for their purpose ; nor in those cases where a guarantee is furnished, are the purchasers, specially the purchasers of small quantities, sure that such commodities are in fact of that quality which they purport to be. Goods purchased through Co-operative agency tend also to be lower in price. By purchasing in large quantities a society is in a better position than the individual farmer to obtain favourable prices, as well as to secure advantages as regards cost of freight. To quote one instance—when a Society was established in 1889 in Pomerania the cultivators were paying 2s. 2d. for cattle salt ; after its establishment it could be sold at 1s. 3½d. and yet the Society made a good profit. Considerable educational influence has been exercised by the Co-operative Supply Societies in Germany. Among the farming classes, specially among small and medium landholders, they have done much to promote the knowledge and use of suitable seeds, manure, implements, etc.

Such societies, therefore, combine various other advantages with none the less important advantage of the easy payment system so necessary for the development of agriculture and the reconstruction of rural credit.

The attention of the Government and of the people should be directed to form such societies with due speed.

CHAPTER V

IRRIGATION

The importance of irrigation in a Province like Bengal can hardly be over-estimated. Out of a total area of 78,000 sq. miles in Bengal, 45,000 sq. miles are under crop, distributed over 33,000 sq. miles under paddy, 3,000 sq. miles under jute and 9,000 sq. miles under other minor crops. Of the remaining area of 33,000 sq. miles, water surfaces (excluding canals) cover about 20,000 sq. miles* and the rest consists of about 10,000 sq. miles of forest, some land under water, and the uncultivated tracts spread over the districts of Bankura, Birbhum, parts of Midnapore, Burdwan and the Barind land near the district of Dacca and in North Bengal.

These figures are quoted to show how by irrigation it is possible to increase the agricultural wealth of the Province by bringing under cultivation portions of uncultivated lands and by bringing in a rotation of crops. The total area under all sorts of irrigation in Bengal is only 1,734,892 acres distributed as follows:—

Canal

Government	...	...	77,188 acres
Private	...	...	203,690 ,,
Tanks	...	...	1,115,120 ,,
Wells	...	...	32,007 ,,
Others	...	...	306,887 ,,

Most of these works, however, are in bad state of repairs. It may be stated in this connection that nearly 50 million acres are under irrigation in India, and of these over 22·5 million by Government canal alone. It is true that there is abundant rain-fall in Bengal, but there are districts in the North-west

* Supplied by the Irrigation Department, Bengal.

and West where the rain is often uncertain and sometimes precarious. Even where the rain-fall is adequate, its distribution is not uniform and consequently storage arrangements are necessary if more than one crop is to be raised from the soil, which is admirably suitable for the purpose.

The history of the canal colonies in the Punjab is an instance in point. The long tract of waste land in the Punjab, which was more or less a desert, has now, after the canals have been opened, become so fertile that the annual value of the crop produced therein was, before the depression, Rs. 30,00,00,000. This immense increase of wealth is vividly reflected in the trade of the province. In the early nineties when the canals were not opened the average annual export of wheat was not more than 250,000 tons ; before the recent depression it was over a million.

The 33,000 sq. miles in Bengal which are more or less under one crop can be made to yield two or even three crops with the help of artificial irrigation ; this rotation of crops will undoubtedly make it possible to offer a solution of the acute problem of growing fodder for cattle on which the development of agriculture so much depends.

Ordinarily speaking there are three special methods of obtaining a supply of water for irrigation purposes, viz. :—

- (1) by means of wells,
- (2) storage tanks, and
- (3) canals derived from the rivers.

Broadly speaking, therefore, the improvement of irrigation in the Province can be effected by

- (1) the improvement of the existing tanks, canals and drains with the help of modern methods using modern tools and plants with a view to keep the cost of re-excavation as low as possible,
- (2) the construction of dams at places where there are only channels,
- (3) the excavation of new canals and drains,

- (4) Intensive use of modern pumping plants with a view to utilise water either from the tanks, canals, or drains,
- (5) Introduction of tubewells of such cost as are accessible to raiyats.

Considering the fact that an agriculturist in Bengal has, on an average, only $2\frac{1}{4}$ acres to plough, irrigation with tubewells certainly offers one of the easiest solutions. The use of tubewells, particularly in places where there is no tank, canal, or well, will be more profitable. With a view to develop tubewell irrigation it appears that

- (1) The drier districts of Bengal should be sub-terraneously surveyed with a view to determine the water level in the underground soil,
- (2) Investigations should be carried on with a view to find out the suitability of tubewells constructed of bamboos such as are in use in Japan,
- (3) To give a fillip to the introduction of this type of irrigation it is necessary to maintain a trained staff for at least five years with a view to advise ignorant people on the question of boring and well-sinking.

In order to spread this type of irrigation amongst the agriculturists and to bring forward the desired effect within a short period it is necessary to have some sort of financial arrangements so that the poor agriculturists will be assured of a quick relief.

The use of pumping plants for the purpose of drawing water from tanks, canals and drains should be more freely encouraged. Experiments carried out at an experimental farm at Berhampur in Bengal have revealed that irrigation with modern pumping plants is more economical than that by the primitive system, as will appear from the following table, a perusal of which will convince the readers of the efficiency of such methods of irrigation :—

1	2	3	4	5	6	7	8	9	10	11	12	13
Name of crop irrigated.	No. of working hours per day.	Area watered.	Fuel used.	Lubricating oil used.	Cost of fuel in 6 hours.	Cost of lubricating oil in 6 hours.	Wages of a cooly and mistri.	Actual cost per day of 6 hours total of columns 6, 7, and 8.	Cost of irrigating an acre.	Irrigation cost per acre with Don from last year's figures on similar land.	Suction head.	Average output of water per hour.
1. Wheat	6 hours	14 cottas	Kerosine oil 84 bottles in 6 hours (2 pint bottle).	1 pint in 6 hours both engine & pump.	1-9-6	0-10-0	Cooly 0-8-0 Mistri 1-8-0	4-3-6	17-11-3	20-0-0	15	6,500
2. Sugar-cane.	do.	18 cottas	do.	do.	1-9-6	0-10-0	.....	...	..	...	...	7,000
						Total	2-0-0	4-3-6	15-1-0	18-0-0	15	6,500-7,000
Area.	Crop on which irrigation experiment was made.				Crop on which irrigation experiment was made.				Crop on which irrigation experiment was made.			
Wet area 30K Dry area 12K	{ Sugar cane				{ Rs. 29 13 0				{ Darjeeling potato			
	{				{ 3 14 13				{			
	{				{ Md. sr. ch.				{			
	{				{ per acre.				{			
	{				{ Rs. 26 14 0				{			
Wet area 3K Dry area 3K	{ Pusa wheat				{ Rs. 14 13 0				{ Local potato			
	{				{ 2 18 2				{			
	{				{ Md. sr. ch.				{			
	{				{ per acre.				{			
	{				{ Rs. 28 2 0				{			

The canal method of irrigation referred to in the beginning of this chapter may be divided into several classes :

(1) The simple "inundation" canals, consisting of water channels, artificial or semi-artificial "unprovided with any means of regulating and controlling the supply at the head which lead water away from the rivers, and are filled only when the latter are in flood, being incapable of drawing off water at other times."

(2) The "periodic" canals—derived from the rivers having a changeable and uncertain supply. In order to prevent water running to waste, some kind of dam is constructed across the river bed, to intercept, store up and divert the water into the canal according to the supply in the river.

(3) The "constant" or "perennial" canals drawing their supply of water from rivers which at all times of the year run with a sufficient volume to supply the canals without previous storage and are provided with dams or weirs and necessary works at the head for raising and regulating the supply of water as required.

"Wells, artificial storage tanks and inundation canals have for ages been largely employed by the natives of the country, also to a certain extent 'periodic' canals ; but it is only during the period of British rule, with small exception, that the great class of 'perennial' canals have been constructed".

By means of irrigation vast tracts of land formerly desert are being brought under the plough. When the Punjab canal colonies have been fully plotted out over 9,000,000 acres in the Province will have been brought under cultivation by irrigation work classed as *productive*. The latest undertaking was the Sukkur Barrage and Canals Irrigating Project costing about Rs. 20—30 crores exclusive of interest charges.

At present we have in India, 75,000 miles of canals irrigating about 50,000,000 acres of land, compared with 20,000,000 acres in the United States and 7,000,000 acres in Japan.

Over those parts of Bengal where the rainfall is uncertain and often scanty, and where cultivation would be impossible without the fertilising influence of water, remnants of old storage

tanks are as numerous as those of "inundation" canals. "These artificial cuts" as MacGeorge has put it, "were sometimes of large dimensions, in some cases they were no doubt originally old abandoned river-channels kept open by continued clearance". As their name implies, they could only be of service during the period when the rivers were in flood.

In 1666 Bernier in describing the Beauty of "Bengale" said :—

"It should be remarked that throughout a country extending nearly a hundred leagues in length, on both banks of the Ganges from Raje-mehale to the sea, is an endless number of channels, cut, in bygone ages, from that river with immense labour, for the conveyance of merchandise and of the water itself, which is reputed by the Indians to be superior to any in the world. These channels are lined on both sides with towns and villages, thickly peopled with Gentiles ; and with extensive fields of rice, sugar, corn, three or four sorts of vegetables, mustard, sesame or oil, and small mulberry-trees two or three feet in height for the food of silk-worms",

—a perfect picture of agricultural wealth which seems to have vanished now.

Sir William Willcocks would not only give the weight of his authority to the statement made by Bernier that most of the rivers in Bengal were canals, but would also attribute the decay of Central Bengal to the neglect of these channels resulting in "overflow" irrigation having ceased to enrich the fields of the Province which had enabled the Bengal peasant to reap fatiguing crop after fatiguing crop with no leguminous rotative crops.

Sir William has confessed that he had always taken the channels in Central Bengal to be "natural rivers" ; and it was only when he inspected them that he revised his opinion. Coming down from Lalgolaghat on the Ganges he, in company with Dr. Bentley, traversed for some 9 or 10 miles a strip of land covered with rich winter crops and then crossing a bank came in the midst of poor scrubby fields of lentils which looked

like having been eaten down by locusts. Dr. Bentley explained to him that the embankments along the Ganges and the Bhagirathi had kept the rich red water of the rivers from flowing over those fields during the monsoon. Then he remembered the parabolic and picturesque description in the old books—how Bhagirath followed by Ganga descended and the current flowed over Bengal. Said Sir William :

“I then saw in vision Bhagirath leading Ganga in canals across the plains. I saw the spoil banks of the canals left with openings to let the rich red water of the river mingle with and fertilise the rainwater of the monsoon as they flowed together through the rice fields. I saw the villagers hurrying to the spoil banks and building their houses above the level of inundation. I saw the canals were broad and deep, carrying the muddy waters of the crest of the river floods and not the heavy silted water of the greater depths. Truly there had been giants on the earth. They lived in specious days and designed like Titans”.

According to Sir William Willcocks the first thing necessary in Bengal is to give plentifully of the rich red water of the flood and so enrich the soil and combat malaria. The second thing is to supply October water which does neither of these. “The first is for every year and every place ; the second is only for the year in which the monsoon fails early. The first has unlimited supplies to draw on ; the second draws on limited supplies. The first is a necessity, the second is a luxury.” And “the first has this great advantage that the crops irrigated with the rich red water of the flood have a vigour and stamina which enable them to withstand the early failure of the monsoon in a way the anæmic crops deprived of the rich red water of the flood have no knowledge of. Anæmic plants and anæmic men go together.”

The beneficial effect of flow irrigation in enriching the soil and removing malaria is recognised in Italy while English farmers on the banks of the Trent and elsewhere have for years been fertilising their lands by capturing the muddy waters of

the river and detaining them until they have deposited their silt. In Italy the purpose of the system, which the Italians call Bonificazione, is not purely agricultural betterment ; it is intended also to banish malaria. Where marshy places are filled up with silt and are kept from being water-logged by drainage the conditions favourable to malaria disappear. The experiment has proved so successful in Italy that the Government of that country have considered themselves justified, *in the interest of public health*, to take compulsory powers over any lands to which they desire to apply Bonificazione.

Hundreds of miles of land in Bengal had been enriched by flood irrigation and Bengal was well known for the health and wealth of her people. We are sure the banishment of malaria from Bengal will also indirectly help her people economically. Enquiries have gone to show that every year there occur in Bengal from 3,50,000 to 4,00,000 deaths from this cause alone. "But a mere enumeration of deaths gives but a faint idea of the ravages of this disease. It is probable that at least a hundred attacks of malaria occur for every death and it is estimated that this disease alone is responsible for 20,00,00,000 days of sickness in the Presidency every year". This gives an idea of its result from an economic point of view. As was stated in the Bengal Census Report of 1911 quoted before :

"Not only does it (malaria) diminish the population by death, but it reduces the vitality of the survivors, saps their vigour and fecundity and *either interrupts the even tenor, or hinders the development of commerce and industry*. A leading cause of poverty and of many other disagreeables in a great part of Bengal—is the prevalence of malaria. For a physical explanation of the Bengalee's lack of energy Malaria would count high."

Dr. Bentley examined the problem from the point of view of public health. He said—"In the deltaic areas of Bengal, still subject to inundation by silt-bearing river water malaria exists to so slight an extent as to be almost negligible" and "deltaic areas which have been deprived of natural fertilising inundations have become malarious and unhealthy". A study

of the conditions appeared to convince him that the only effective way of combating malaria in unhealthy places is—

- (1) to encourage agriculture, and
- (2) to bring once more under regular cultivation the areas of waste and fallow, which are no longer cropped.

But how to accomplish this? It can be accomplished only by increasing the fertility of the soil by the use of either manures, natural or artificial which must be necessarily costly or by *flood irrigation which costs very little*.

Sir William Willcocks expressed the following opinion on the restoration of the ancient irrigation of Bengal :—

“All the canals were originally straight as a matter of course, but their winding courses to-day are the true gauge of the friability of the soil they traverse. They are nature’s own masterful and cunning handiwork and need no time spent on surveying and general levelling. Level down the existing channels and clear them out. Water ran down them in the past, it will run down in the future. They are spaced ready for ‘overflow irrigation’.”

With due deference to the great irrigation expert—the greatest deltaic irrigation expert of his time who had worked wonders in Egypt, it may be said, however, that it is safe, if not necessary, too, to have a level survey made before irrigation schemes are undertaken. Nature is often cruelly capricious, rivers in Bengal have been known to have changed their courses, leaving the old beds for new, and cataclysmic changes, such as earthquakes have been known to bring about changes in their beds. The survey of the Nadia Drainage Division rivers would, we are sure, serve as an object lesson in such changes. A comprehensive level survey should, therefore, be undertaken without delay, to be completed in course of two years, to enable necessary work to be undertaken as early as possible.

Legal difficulties should be overcome by legislation to run water through old but abandoned channels and if their resuscitation should give rise to claims for compensation by either the landlord or the leaseholder or occupancy holder such claims,

if reasonable, could easily be recompensed from resources available on fees realised for betterment or improvements of lands through which irrigation is revived, on the same principle as the Improvement Trust levies betterment fees. They may also be called upon to make a *pro rata* contribution towards the cost of such improvement. Either the one or the other or both, according to circumstances, may be availed of to give the fields of the Province a new life and the agriculturist as well as the village folk an opportunity to live a life of health and comfort. In various places not only have the zamindars leased out to cultivators the embankments or the immediate banks of old water courses but in some cases the old beds themselves are being used for cultivation. No compensation need be considered for the use of the old beds and embankments as before.

The next question will be to make the cultivators use irrigation waters. The task is by no means difficult if proper and persistent propaganda is carried on to explain to them the advantages of such use. The Bengal cultivator is not slow to realise his own interest ; and the small-scale experiment carried out in Midnapore will go to show how the sympathy and support of the cultivators can be secured and how co-operation will minimise the expenditure to be incurred.

The idea of the experiment at Midnapore originated with the late Mr. Peddie, the District Magistrate who was a believer in the efficiency of flood or overflow irrigation as a remedy for malaria which had been devastating large areas in the district. He decided to submit a proposal to the Government to see if flushing would not improve the health of the people in the villages near the distributories in the Midnapore Canal area. The scheme was submitted to the Irrigation and Public Health Departments of the Government of Bengal and the opinion expressed by them was that flushing to be effective must be a wholesale flush over a definite area including the paddy fields and that it must be such as would submerge all the *ails* in the fields for as long a period as possible. The experiment was put into operation during the official year 1932-33—the areas selected for the operation being some of the worst malaria-stricken places

in the Naraingarh, Pingla and Debra *thanas* where the spleen rate was high.

Mr. Peddie had realised the difficulties of the work undertaken and to overcome them had prepared a scheme with a view to secure the co-operation of the people interested in the operations. Local committees were formed to mobilise public opinion, to disarm the opposition of those who, through ignorance, consider everything new impious. The work of distributing the water properly by cutting drainage channels in places through *ail bunds* was also entrusted to these committees. As anticipated the scheme was at first viewed with suspicion by some of the people, and suspicion is contagious. Local co-operation was, therefore, slow to be forthcoming to the extent required and it was found advisable to limit the area of operations to 3,500 acres only in the Naraingarh and Pingla *thanas* where many villagers gave written undertakings that they would not claim compensation in the event of any damage happening. Owing to copious rainfall ploughing had commenced earlier than usual and it was found that paddy seedlings in the field were too young in the middle of June to stand the flushing operations which had, therefore, to be postponed till July.

For the purpose of the operation the area was divided into blocks so that each block could be treated separately. Water had to be led along carefully so as not to create breaches in the bank and damage the crops in the adjoining fields where they were still too young to withstand the flush.

The local committee worked hard, and their efforts to secure *voluntary labour* from the villages were eminently successful—demonstrating the desire of the people to help themselves provided the utility of the work undertaken was properly explained to them. The rich red water of the canal was led by cutting channels and trenches from tank to tank and pool to pool.

A second flushing was given in October and November. The success has been amazing from the point of view of health. As a result of local voluntary labour being secured the cost

which had to be incurred was nominal, *viz.*, in the Naraingarh area Rs. 17 and in the Pingla area Rs. 90.

In small efforts such voluntary labour can be secured resulting in the cost being minimised—a great gain indeed.

Local help would not only minimise the cost of undertakings but would ensure success. What is even more valuable as a national asset is that it would teach the people a lesson in self-help and in the art of organisation. These are assets the value of which cannot be over-estimated. The Government should not be expected or asked to do everything unaided. Spoonfeeding is dangerous in the case of individuals, as in that of communities and nations and should not be encouraged. The Government are fully aware of the danger as will be evident from the general principle laid down by them in their Resolution on Local Self-Government which states that, "except in cases of really grave mismanagement local bodies should be permitted to make mistakes and learn by them rather than be subjected to interference either from within or from outside".

How irrigation has actually changed the face of Egypt would be apparent from the fact that it is the richest agricultural country in the world for its size. It cultivates only 3,500,000 acres and lives on its agricultural produce. It pays a revenue of £38,000,000 per year without difficulty and supports a population of 15,000,000 people. Agricultural land can be rented for £20 per acre per annum, with a selling value of £400 per acre.

What about the Central Bengal? It no longer enjoys the rich red water of the flood mingled with the waters of the monsoon rainfall and everywhere we find evidence of decay. Said Sir William Willcocks,

"In Egypt we consider a red water famine as the greatest calamity which can overtake the country. Such a famine has overtaken both Central and Western Bengal. . . . Wherever to-day we can see such irrigation, we feel, we are in Egypt. Wherever we see water to-day, we see the trees look fresh and the crops green ; they respond to irrigation. In Central Bengal we have 6,000,000 acres

of land as level as a billiard table ready for the most perfect irrigation constituting an asset worth £5 per acre in labour alone. There are about 1,000,000 acres of groves of mangoes, bananas, fruit trees and ordinary trees which would be improved indeed by red water irrigation, and ordinarily by a rise of spring level."

The scheme which Sir William Willcocks adumbrated was to pierce the existing embankments at suitable points, notably opposite old channels with numerous openings—each opening to be 10 feet wide, open to the top, with iron horizontal and vertical wooden needles of the old Egyptian type, with a channel some 10 feet wide and some 2 feet deep leading for a mile or more to begin with. These openings would face the flood clean open and be regulated by needles if the flood is dangerously high. Leaks between the needles will not matter when the land is all under rice. A year's trial would teach all the lessons needed. Sir William wanted to begin with the districts of Murshidabad and Nadia to clean the old canals and make them workable. "This" he said "is a great national work. It is resuscitation of the whole of the true Gangetic delta and is to be undertaken in the spirit of national work."

It will be necessary to train the rivers and the vigorous oftakes should be protected by massive stone walls. "When the river is once trained and its banks protected it will be possible to put pumps on the banks and provide perennial irrigation to a distance of 20 miles from the Ganges". Modern pumps are not, very expensive, but are effective. The water stored in pools, tanks and depressions will be found in this way a valuable asset to the country. Those who know how the cultivators in Burdwan and the neighbouring districts irrigate their crop with water taken from tank to tank and depression to depression which entails much waste of water and much more waste of labour, will at once be convinced that the cultivators will not be slow to take to the use of the pumps provided they can have them on the easy payment system. At this stage the "overflow" canals will be beginning to show their value and it will be time to control the flood water of the Ganges and insure every year

a full flood. "This", said Sir William Willcocks, "will be done by an Egyptian barrage at a point about 14 miles below the Borai Head. Such a barrage could be built well within deep iron piles in one half of the width of the river protected from the highest floods and built in the dry and the river then turned over it."

We need not quote the details supplied by Sir William. We only give here his conclusion: "The delta of the Ganges is so conveniently deposited that one barrage will suffice for the whole of Central Bengal and the Bhagirathi as well, which will eventually have the Jalingi as its summer feeder. It will be possible to feed the Jalingi and the Mathabhanga in winter and summer by holding up 12 feet of water in low supply". According to him Central Bengal will be completely served by one barrage for 6,000,000 acres and the complete control of the supply of the Hooghly for Calcutta—the whole arrangement costing not more than £12,000,000, a small sum for so large a programme of work.

In Western Bengal the Damodar lies high and can easily irrigate. Even in 1815 it was found that in productive agricultural value in proportion to its size in the whole of India, Burdwan claimed first rank. The water of the Damodar flowed through canals dug by the people and Burdwan had about 50,000 tanks which stored flood water for summer use.

How conditions have changed! But what is to be done? The different channels which originally led off from the left bank of the Damodar towards the Hooghly are canals. "These must first be restored and have all obstructions removed and be cleared and provided with light banks made of earth taken out of the canals. Never again shall there be the water-tight compartments called banks." The initial work must be undertaken by the Government. The working of the canals and their subsequent clearances may be left to the District Boards. "The real passion for co-operation we see everywhere to-day is an echo of the time when co-operation was the life-blood of Bengal irrigation."

The initial cost will be considerable and shall have to be

raised by a special loan. But the loan can be easily repaid. There are some people who are chary to believe that it would be easy to levy water rates. The easiest course to adopt would be to levy a small tax on land which may be benefited by the water. When the cultivator has to pay the tax, whether he uses the water or not, he will certainly use it. Then again the increase of wealth will increase the paying and spending power of the people. The Egyptian Government have never made more than 2 p.c. by direct taxation to the Asuan dam and yet it has made millions by the increase in wealth of the peasantry, and their power to spend money ; while owing to the insurance of irrigation the price of land in Egypt rose to almost immediately from 14 years' purchase to 20 years' purchase or by 40 per cent, and has remained at this figure. With the fertility of the soil increased a rise in the price of land is inevitable. It has been so in Egypt ; it will be so in Central and Western Bengal where the price of land is considerably lower than in East Bengal because of the fertility of the land in East Bengal.

A comprehensive scheme of irrigation must be prepared and its cost carefully calculated. If we are not mistaken the level surveys of some parts of Central and Western Bengal have already been made and the results are available in the Bengal Secretariat. Their cost has also been calculated. Where the survey reports are available the next step will be to calculate the cost and devise ways and means. The money that will have to be spent on irrigation will be money well and profitably spent, for it will yield a great return.

Past experience has demonstrated that in India irrigation works have been more profitable than railways. The comparative financial importance of the two was very clearly expressed by Sir Arthur Cotton in his evidence before the Select Committee of 1878 when he said,

"It has taken thirty-two years to obtain £700,000 for them (the irrigation works) £20,000 a year for works which from the very first had been a most prodigious success. . . . The only dispute is whether they yield

27, 28 or 40 per cent. ; and now after thirty-two years only 700,000 acres out of one million are irrigated. . . . During this time there was not the least question about £500,000 for sixty miles of railways to Nagpur, which it was acknowledged would not pay 4 per cent”.

“The History of Railways in India”, said Romesh Chunder Dutt, “is different in its character from the history of irrigation works. Irrigation works paid, and more than paid, from the very commencement ; railways did not give an adequate return on the outlay. Irrigation works were converted into a source of revenue by the Government ; railways led to a permanent loss to the Government year after year. Irrigation secured crops, increased the produce and averted famines in years of drought ; railways helped the conveyance of food to efficient tracts in famine years, but did not add to the produce of the land”.

It is not our purpose to examine the comparative importance of the two. But we repeat what Mr. Dutt had said “*irrigation secures crops, increases the produce and averts famines*”. It does more. It improves the health of the people by banishing malaria, which itself is an economic gain of the highest value.

The functions of railways and irrigation are certainly different, but unless production increases, increased transport facilities will only lead to idle rolling stock. It is an admitted fact that as between production and transport, the pace has been uneven. With major railway programmes completed the Government of India can now turn towards irrigation and help the provinces with necessary funds, to construct and improve irrigation works and thereby increase the productive capacity of the country.

When they do this, need it be said that its importance in any programme of development and reconstruction cannot be over-estimated? Bengal has always depended on irrigation for her fertility which was the source of her wealth and also of the health of her teeming millions. The people of Bengal

were experts in constructing canals and it is on record that men from Lower Bengal dug the canals at Tanjore.

It is not difficult to restore the ancient irrigation of Bengal. Time and again have proposals to clear the old water channels been mooted ; but no systematic attempt has been made in the direction.

The reconstruction of the Province demands that immediate attention should be paid to irrigation in the Gangetic delta. Popular co-operation should be secured and money found for the work.

CHAPTER VI

RURAL INDEBTEDNESS

The genial author of *Twenty-one Days in India* described the Indian villager as "famine-haunted." He began by speaking of famines and said, "You will ask, 'what has all this talk of food and famine to do with the village?' I reply, 'everything'." Famine is the horizon of the Indian villager ; insufficient food is the foreground. The poverty of the Indian peasants has attracted the attention of every foreign traveller during the past hundred years and more ; it has made every student of Indian economics almost despair. Their poverty is their destruction. It is the destruction of the nationhood of India. It is the destruction of the manhood of India.

The Government realised the difficulty of the problem early in their career in India. As early as 1772 we find that the Circuit Committee framed rules regarding adjustment of debts and rates of interest. Clause 18 of these rules runs as follows :—

"That in adjusting the claims of old debts it shall be observed as a rule that they bear no further interest after such adjustment but that the amount shall be payable by *Kistibundee* (instalment) according to the circumstances of the party, and as the rates of interest hitherto authorised by custom have amounted to the most exorbitant usury, the following rates are now established to be received and paid as well for past debts as on future loans of money ; viz., on sums not exceeding Rs. 100 principal, an interest of Rs. 3 as. 2 per cent. per mensem or $\frac{1}{2}$ anna in the rupee. On sums above Rs. 100 principal an interest of Rs. 2 per cent. per mensem. The principal and interest to be discharged according to the conditions of the bond and all compound interest arising from an intermediate adjustment of accounts to be deemed unlawful and prohibited ; when a debt is sued for upon a bond which

shall be found to specify a higher rate of interest than the established rates, the interest shall be wholly forfeited to the debtor and the principal only recoverable ; and that all attempts to elude the law by deductions from the original loan under whatever denomination shall be punished by a forfeiture of one moiety of the amount of the bond to the Government and the other half to the debtor."

This rule framed more than a hundred and fifty years back represents, perhaps, the first attempt by any government in the country at debt conciliation with a view to afford some relief to the people. The rate of interest "established to be received and paid" under this rule may seem to be excessive ; but it must not be forgotten that in those early days of British rule in the country any violent deviation from rules and customs prevalent among the people must have been regarded as fraught with dangerous possibilities. In 1780 Adam Smith's *magnum opus*, the *Wealth of Nations* was published and in it he wrote—"In Bengal money is frequently lent to the farmers at 40, 50 or 60 per cent. interest, and the succeeding crop is mortgaged for payment."

Unfortunately the rule quoted above seems never to have been strictly enforced, while all subsequent attempts by Government to protect the debtor from the ravages of the money-lender seem to have been successfully evaded by the latter. For, in 1913, the MacLagan Committee reported, "The money-lenders' rates we have found in many places to be as much as 38, 48 and 60 per cent."

No wonder, the members of the Royal Commission on Agriculture in India found that to a very great extent the cultivator labours not for a profit, nor for a net return, but for subsistence. He is forced to grow food wherever he can and on whatever terms he can.

Sir Andrew Fraser, sometime Lieutenant-Governor of Bengal, admitted that one of the greatest evils connected with agricultural life in the country is the indebtedness of the people, and the difficulty that they have in obtaining command of

capital for carrying on agricultural work and effecting improvements on anything like reasonable terms.

Even now no systematic survey of rural indebtedness, no scheme of debt, conciliation has been undertaken, though the necessity for "compulsory adjustment of accumulated debt under some suitable judicial procedure, which will ensure that every interest will be fairly dealt with," has been fully recognised. In Bengal, the first attempt to gauge rural indebtedness was made by the late Mr. Jack in his *Economic Life of a Bengal District* which was published in 1916. He took a typical rural family in the district of Faridpur as consisting of five persons, including children, and according to his calculation the average indebtedness of such a family turned out to be Rs. 55 ; he pointed out that 55 per cent. of the cultivators in the district were free from debt, and, therefore, if the average is taken over, families in debt alone, it turns out to be Rs. 121 or 122. On the basis of Mr. Ascoli's figures given in the Settlement Report of the District of Dacca the average for each family comes up to be Rs. 121, including both agriculturists and non-agriculturists. If, however, the average is taken over families in debt, numbering 185,869 in all, the figure becomes Rs. 256. There were other independent investigators like Mr. Sachse and Khan Bahadur Abdul Momin. The Bengal Banking Enquiry Committee, which made a comprehensive survey of the economic situation in Bengal, also investigated the problem and came to the conclusion that the indebtedness of the average agriculturist family here was Rs. 160. The figures are widely divergent, but we are inclined to believe that the figure given by the Banking Enquiry Committee is the most reliable. As Mr. Nalini Ranjan Sarkar, the President of the Bengal National Chamber of Commerce, has pointed out in his highly informative brochure on the subject, the method of calculation adopted by the Committee was the best under the circumstances in view of the fact that adequate statistical data are lacking.

Registration figures supply a good basis for calculation. And it is found that from 1918 to 1919 the aggregate of

registered mortgages in Bengal rose from $8\frac{3}{4}$ to $11\frac{3}{4}$ crores of rupees in value, an enormous increase which shows how liabilities are piling up.

The relevant figures are reproduced in the following table for twelve years from 1917 to 1928:

				Aggregate value of mortgages registered in Bengal.	
Year.				Rs.	
1917	...	...	...	9,71,96,805	
1918	...	...	...	8,29,04,882	
1919	...	...	...	11,76,53,130	
1920	...	...	...	14,99,42,104	
1921	...	...	...	18,10,82,437	
1922	...	...	...	18,27,31,014	
1923	...	...	...	14,83,61,044	
1924	...	...	...	14,77,51,694	
1925	...	...	...	17,13,05,258	
1926	...	...	...	14,90,20,380	
1927	...	...	...	15,42,81,493	
1928	...	...	...	16,40,68,901	

The period 1925-30 was fairly prosperous for the agriculturists. Even if there was no large repayment of debts on the balance, possibly no large additions occurred. The sum of the mortgage figures of these six years—a mortgage runs for 12 years—plus 25 per cent. for unregistered debts, less a certain percentage for urban areas may be taken as the outstanding rural debt at the end of 1930. Taking the indebtedness of the average agriculturist family to be Rs. 160 (with additions of interest) and calculating on the basis of the figures given by the Census of 1921, the total agricultural debt in Bengal was calculated to be Rs. 100 crores by the Bengal Banking Enquiry Committee, and this figure was accepted by the Indian Banking Enquiry Committee.

During the last three years there has been very little payment either of interest or of the principal. Although the

agriculturists could borrow very little in this period, the total debt at the end of 1933, including accumulated interest was certainly not less than Rs. 150 crores.

The question that naturally arises in one's mind in this connection is what is the amount of indebtedness in other provinces of India. Some very interesting figures, as regards total indebtedness and average indebtedness per head of agriculturist in the various provinces have been quoted by Mr. Sarkar in the brochure referred to above. These figures might lead one to suppose that the problem of indebtedness is not so acute in Bengal as in the other provinces—a supposition for which there neither is nor can be any justification whether in facts or in figures. Such an impression would be misleading as Mr. Sarkar points out. We must remember that the pressure of population on the soil here is more excessive than elsewhere, the average yield per acre at the same time not being higher, than that in many other provinces. When all these things are taken into consideration, it will appear that the burden of agricultural indebtedness is heavier here than anywhere else in India.

Loans are incurred for various reasons, the most important and urgent of course being for food in years when the crop fails. In Bengal, the irrigated area under cultivation is practically negligible and agriculture is a gamble in rain. In the cultivator—who is *eksal amir eksal faquir*, i.e., rich one year and a beggar another—the gambler's habits prevail. Social obligations often tax the resources of the cultivator. And the rate of interest is high. His illiteracy and ignorance of business methods are often exploited by the money-lender, while the many discounts at the time of granting the loan and other malpractices are not unknown.

In course of intensive village enquiries carried out by the Bengal Banking Enquiry Committee interesting facts emerged. In the village of Karimpur in the Bogra district there were 52 agriculturists having a total debt of Rs. 9,132 in cash and 159 maunds of paddy in kind. The latter was incurred wholly for

food. The various purposes for which loans were incurred during one year 1928-29 were stated to be as follows :—

For repayment of old debts	...	Rs. 389 •
For capital expenditure on permanent improvements including purchase of cattle	...	„ 1,087
For payment of land revenue and rent	... ..	„ 573
For expenses of cultivation	...	„ 435
For social and religious ceremonies	...	„ 150
For litigation	... ..	„ 15
For other purposes	... ..	„ 66
		<hr/> Rs. 2,715

An analysis of the statement would go to show :—

(1) The 52 agriculturist families were already in debt and yet had to borrow on top of it a sum of Rs. 2,715 during the year. Unfortunately the purposes for the former loans could not be ascertained.

(2) Naturally a very small fraction of the accumulated debt could be paid and thus the debt was left to mount up, one on the top of an unexpired one.

(3) The amount borrowed for capital expenditure, etc., was by no means insignificant ; in fact it was almost half of the amount borrowed.

(4) Even for the purpose of paying land revenue and rent the agriculturists had to incur further debt, a fact which discloses their utter helplessness.

(5) Social and religious ceremonies and litigation do not account for a very large portion of the debt incurred—though usually they are made responsible for much of the cultivator's woe. Sometimes litigation becomes inevitable and social beings must conform to social obligations.

There is a very common impression in Bengal that the wasteful expenditure on marriages and other ceremonies and litigation account for a major portion of the agriculturist's debt.

But the figures given above amply demonstrate that they are responsible only for a fraction of the total. There is a marked difference in this respect between the situation in Bengal and that in some other provinces.

As regards the Punjab, for instance, Darling, the author of that interesting study *The Punjab Peasant in Prosperity and Debt* states, "Marriages absorb a full year's income or more of all but the richest," and this is one of the reasons why the wealth which might be made the basis of a national development—as vigorous as that of Japan—threatens to become a disturbing, if not a corrupting influence in the State.

Nor is this story singular in its application to British Indians. It is Indian, widespread in its application wherever you go ; for, in the State of Baroda in Guzerat the main reasons for starting a Rural Reconstruction Centre at Kosamba, as explained by a Press Note issued over the signature of the Dewan of Baroda, were stated to be :—

(i) litigation, and

(ii) expenditure on marriage and funeral ceremonies, fifty per cent. of the total debt being incurred for the latter. Economic improvement, it was emphasised in the Press Note, was impossible unless agriculturists were emancipated from the debt of old social customs.

In some cases the unscrupulous underlings of the *zeminder* had taken as much advantage of the ignorance and helplessness of the raiyats as the money-lender. In justifying their survey and settlement operations the Government in one of their Resolutions cited some instances of the oppression of zemindars. We refrain from giving their names in quoting below a few passages from the Resolution :—

"Illegal enhancement of rent, oppression by the landlords, and consequent discontent among the tenantry were found to be prevalent to a greater or less degree in nearly all parts of the district. In one large village, the property of the
 . . . Babus, the misconduct and oppression of the landlords' agents had driven the tenants into open revolt. In the large estates of the tenants to whom no proper receipts were

given were reduced to the verge of despair by confused accounts which showed them as hopelessly indebted to the landlord. And in pargana . . . the landlord . . . had not merely enhanced rents illegally, but had obtained from the raiyats agreements to surrender their land at the end of five years and thus rob themselves of their most cherished rights of occupancy."

"Even in the estates of . . . the wealthiest zemindar . . . which cover two-fifths of the district . . . the facts brought to light are far from creditable to the management . . . Illegal enhancements have been numerous . . . The raiyats complained not so much that the rates arbitrarily fixed . . . were more than they could afford to pay, but the constant changes in the rent-rolls had destroyed all sense of security."

Such cases are becoming more and more rare. Survey and settlement operations have been in progress, the Record of Rights has been prepared to provide safety and security to the agriculturists whose rights are being more and more recognised ; above all, the agriculturists themselves are becoming increasingly conscious of their rights, which is of the greatest importance. But the past cannot be obliterated nor can the liabilities incurred in the past be wiped out. They endure and act as a dead-weight.

Then, of course, there is the money-lender who has often been a necessary evil. Act after Act has been passed by the legislature to save the debtor but the members of the Royal Commission on Indian Agriculture were constrained to admit that legislative measures to deal with the problem of indebtedness have not been the unqualified success ; it was expected they should be ; they have moreover said, "the solution of the problem of indebtedness has proved a comparative failure." It has been admitted that "the provisions of the Deccan Agriculturist's Relief Act are being evaded and the Usurious Loans Act is practically a dead letter in every province of India." It is difficult to avoid the conclusion that there had been a serious increase of debts in the districts affected by the Deccan Act and that each year a larger proportion of that debt became a burden

on the land. The conclusions of the Commission of 1892 were summarised as follows :—

“It is a contest of dishonesty, in which that side is likely to gain the upper hand which is prepared to go farthest in perjury and in the production of false evidence. Witness after witness has testified to this demoralisation. Distrust has been engendered on both sides. The honest *sowcar* and honest cultivator suffer alike, since, in their dealings with one another they have to allow for the judgment of a court which will presume dishonesty on both sides. Hence it is that an Act whose main object was to put the relations between agriculturists and money-lenders on a better footing, is actually having an opposite effect.”

The demoralisation of the people is a serious danger which cannot be contemplated with equanimity. It is only last year that the Bengal Legislative Council passed an Act to supplement the Usurious Loans Act of 1918 to reduce the borrowing rate in rural areas to something like an economic rate as well as to check some of the malpractices of the money-lenders. We refer to the Bengal Money Lender's Act of 1933 sponsored by Khan Bahadur M. Azizul Haque. The main provisions of the Act are as follows :—

(1) That in any suit in respect of any money lent by a money-lender before the commencement of the Act if the terms provide any interest exceeding the rate of 15% in case of secured loans or 25% in case of unsecured loans or stipulating for rests at intervals of less than 6 months, the court shall presume such interest to be excessive and transaction harsh, unconscionable and substantially unfair.

(2) That no court shall decree any amount on account of arrears of interest a sum greater than the principal of the loan in the aforesaid cases.

(3) That in respect of all loans made after the commencement of the Act no money-lender shall recover by suit, any interest exceeding 10% per annum if the contract provides for any compound interest or shall get a decree on account of arrear of interest a sum greater than the principal of the loan.

(4) That every debtor shall be entitled to get prescribed particulars of loans or sums due or other necessary and prescribed particulars from money-lender and shall also be entitled to deposit money due to a money-lender in *Civil Court*.

Although the history of the Usurious Loans Act of 1918 and similar measures do not encourage us to build high hopes on the efficiency of legislative measures yet in fairness it must be said that there are several features in the present Act which warrant the belief that its fate will not be so unhappy as its predecessors' has been. As we shall show later on, it may be very profitably used by the Courts in their task of compulsory settlement of debts in cases where voluntary conciliation will fail.

Debts are oftener than not hereditary. The crushing burden of hereditary debt, often far beyond the debtor's power to redeem, remains largely through ignorance of the legal position which is "that no personal liability is transmitted and that no suit lies against the heirs of a deceased debtor except to the extent to which the property of deceased has come into their hands by survivorship or succession."

It has brought the average cultivator to such a state of helplessness that even attempts to give him a fresh start in life by wholesale redemption of old debts have sometimes proved unsuccessful. And the Royal Commission on Agriculture in India even went to the extent of declaring that, "The solution of the problem of indebtedness is only to be found in the cumulative effect of the spread of literacy and in the co-operative movement." That primary education has not yet been made free and compulsory throughout the country is to be deplored. But can we wait till education has entered every hamlet? Most decidedly not. The solution of the problem will not brook delay without atrophy of the nation's vital system.

The cultivator has to borrow and borrow for the immediate satisfaction of human wants. The difference in the use to which the principal is put is the cause of the difference in the rates of interest which are paid for the loan. A man borrowing capital for a productive purpose is able to calculate the rate of

interest which he can afford to pay, and interest is, therefore, never in excess of the profit which the capital is expected to yield. But "the culmination of misery is not capable of quantitative estimation, and the poor wretch in distress is ready to promise anything which will procure him the immediate satisfaction of his wants. The money-lender exploits his compulsion of want, and then takes advantage of his ignorance and superstition."

Bengal and India are not the only places where the average agriculturist had been in debt before modern methods were adopted to give him relief and make him self-reliant. In his invaluable Report upon Land and Agricultural Banks Sir F. A. Nicholson observes :—

"The lesson of the universal history from Rome to Scotland is that an essential of agriculture is credit. Neither the condition of the country nor the nature of the land tenures, nor the position of agriculture affects the one great fact that agriculturists must borrow."

The facts upon which Sir F. A. Nicholson based his generalisation are of interest in judging the Indian agriculturist. "Probably nowhere in the world except among the rich farmers of England is sufficient capital owned by the farmer himself ; even the English farmer, with the advantage of renting land largely developed by his landlord's capital, and finding, therefore, only the working capital, is accustomed to borrow freely from his banker, whether for advances at seed-time, for purchase of manure, for extra wages at harvest, etc., this he usually does by a short bill, or in Scotland by a cash credit. But in Europe, where small and medium cultivation is the rule, and where the farmer so frequently owns the land he tills, the bulk of the farmers are in debt, and that heavily ; the necessary complement, in fact, of the peasant proprietor is the money-lender."

The heavy indebtedness of European agriculturists was not due, to any great extent, to improvements and developments ; it was of long standing and had originated long before the modern development of farming with co-operative institutions to work wonders. It was like what Holt Mackenzie in

his evidence before the Select Committee on the Affairs of the India Company said in 1832—"a great majority of the cultivators in Bengal seemed to live from hand to mouth, and to be always in debt."

In France the mortgage debt in 1840 was £480,000,000. The estimate for Prussia alone was, in 1869, above £337,000,000 and below £375,000,000. In only a portion of Austria—a comparatively poor country with only 160 persons to the square mile—the mortgage debts in 1888 were £160,000,000 on peasants' holdings only, while the increase between 1867-88 was 42 per cent. For Italy the figures were very heavy. On January 1, 1888, the registered mortgage debt bearing interest was above £328,000,000 in addition to registered charges of above £71,000,000. These latter were claims upon property not susceptible of interest, such as dues for construction, supply of materials etc. "Often the interest on a loan representing only half the value of the land absorbs the profit of the whole."

In France the great mass of agricultural mortgage debt was held by private lenders, and probably the whole of the *personal credit rural debt*. These money-lenders were frequently mere usurers. "Very often they avail themselves of the misfortune of the borrower; they trade upon his misery and ignorance. . . They are frequently the ruin of the agriculturist." The details of their transactions were not unlike those in Bengal. Beginning with a simple note or bond, all the tricks of the trade were habitually and purposely resorted to, until the entire assets of the peasant were in the usurer's hand. The best of French farmers and the richest cultivators were compelled every year to borrow at the rate of 10 per cent. This is the rate paid by the small farmer in normal years. It may be imagined what it would be in abnormal years, and perhaps for unfortunate folk the situation may be conceived to be far worse.

The picture in Germany was even more pitiful. "For want of credit institutions over the greater part of the country, usury is almost universal, and 'from its pitiless exploitation of the smaller agriculturists, it is considered as a menacing social

danger.' The peasant is 'unable to take count of his pecuniary situation'; he keeps no books, and cannot judge of the pecuniary result of a transaction, whether of a venture in cultivation or of a loan from a money-lender. The result is that the rural classes 'fall into the clutches of men who, under colour of helping them, desire nothing save their ruin for the profit of the lender himself.' These are represented as lying in wait for misfortune, and are as eager as vultures when there is a chance of prey."

The indebtedness of the small farmer had been for a long time a matter of grave anxiety in all countries in Europe just as it is in Bengal to-day. And what was the solution that was discovered, the sovereign alchemy that brought about a change?

It was the terrible misery of the German peasants as regards usury described before—misery which has its parallel in Bengal and other parts of India—and the 'frightful and shameless' actions of the usurers that led Schulze Delitzsch and Raiffeisen to the idea of popular banks or credit unions, the latter regarding the usury question as the most important of the then social problems. In Flammersfeld the cultivators "seldom had cattle of their own but borrowed them from the dealers whose terms they were forced to accept on penalty of losing their cattle and the dealer was thus able to extort, while the misery of the peasant increased yet more and more." In some places the money-lender was so powerful that the produce was often handed over bodily to him on his own terms; he then—again on his own terms—supplied the peasant—just what we witness to-day in parts of Bengal.

Co-operative credit institutions changed these scenes of poverty and misery. One characteristic instance which may be cited is that of the Grand Duchy of Saxe-Weimar. Wolff describes the change thus:—

"There, in what not long ago was a forlorn district something like a rural Seven Dials, stands the forsaken village of Frankenheim. Poor, neglected it was, with tumble-down houses, all of them heavily mortgaged, badly tilled fields. . . . In pity the Grand Duchess had some model dwellings set up, erected

at comparatively considerable cost, but to let at a nominal rent of 30 s. a year. The success was not particularly encouraging. Some time after the Lutheran Vicar of the parish resolved on trying the effects of a loan bank of the Raiffeisen type. With the help of the money so secured—on these poor people's own collective credit—he built houses, each of which with the ground upon which it stands and the garden surrounding it, cost a little under £60. For these houses the occupiers are required to pay $4\frac{1}{2}$ per cent. interest, *plus* one-fifteenth or one-twentieth of the principal each year by way of sinking fund; therefore, in all, according to the circumstances, either £5-12s. or £6-12s., in consideration of which the houses become their own after a certain period. All these houses have been readily taken up; the tenants pay their rents regularly, and thanks to the money brought into the village, the whole face of things has become changed. The dwellings have become decent, the gardens well kept, the fields well tilled, the 'Jews' have been paid off, the cattle are well fed, and the human inhabitants are known throughout the country as orderly, well-conducted, industrious, saving and thriving folk."

The problem before us is therefore threefold. (1) The old accumulated debts of the agriculturist is to be altogether wiped off or considerably reduced, (2) he is to be given such assistance that he may not be required to borrow again to meet his ordinary requirements and, (3) facilities are to be extended to him so that by utilising them properly he may produce more than he consumes, or in other words, accumulate some capital. For all these, co-operation, with active assistance from the State and sympathy from the general public, is the only remedy.

An examination of the various types of co-operative credit institutions goes to show that the Raiffeisen banks suggest the most hopeful method of curing the canker of rural life in this Province, the chronic indebtedness of the peasantry. Needless to say the banks in the various parts of the Province will have to be constructed according to the conditions of those whom they will serve.

Then again "the organisation of co-operative credit results

in very much more than the alleviation of a particular form of distress. It is also the means of bringing into the agricultural industry that capital of which it stands so much in need. Left to himself, the peasant is more apt to spend a loan in unproductive uses than in improving his farm ; under the guidance of the bank, he is more likely to use it as capital than in gratifying his personal wants and desires. But, important as is the application of capital to agriculture, this is not the greatest service which the Raiffeisen bank renders to rural society. Its greatest value lies in its educative activities. The co-operative credit bank is the germ from which co-operation in all its varied forms most easily and most often grows. Foresight and energy in the people are the only solid foundations of all industrial prosperity, and these virtues are not only stimulated, but seem even to be created by banks of the Raiffeisen type."

The examples of Denmark and Ireland are too well-known to require elaborate description. Indeed the reconstruction of these two mainly agricultural countries has been due to co-operative credit societies. Mr. J. R. Cahill in the Report on Agricultural Credit and Agricultural Co-operation in Germany presented to the Board of Agriculture and Fisheries, Great Britain, draws our attention to the fact that Germany and Denmark are not alone in having developed a vigorous co-operative movement ; co-operation in agriculture is a world movement to-day and corresponds to similar movements among other producing classes. At present what we are directly concerned with is rural indebtedness and the first thing to be done is to remove or reduce the dead weight of this debt. It has to be remembered that the remedy to be successful should come through co-operation as has been demonstrated by the example of other agricultural countries.

We have said before that the Bengal Provincial Banking Enquiry Committee came to the conclusion that the total agricultural debt of Bengal was roughly Rs. 100 crores. The Report of the Committee was published in 1930. Since then the economic depression has pressed heavily on the Province. A recently published Press Note issued by the Imperial Council

of Agricultural Research has placed before the public figures relating to jute which give us a clear idea of the effect of the depression on Bengal. For thirty years the harvest price of jute had been steadily on the increase. The figures are:—

1900—04	...	...	Rs. 4.1	per	maund
1905—09	...	...	5.2	„	„
1910—14	...	...	6.8	„	„
1915—19	...	...	6.15	„	„
1920—24	...	...	8.8	„	„
1925—30	...	...	10.4	„	„

In 1930, the year before the depression affected jute, prices fell to Rs. 8, still a quite remunerative price. In 1931 the price sharply declined to Rs. 3/8, in 1932 to Rs. 3/4, and at present it is below Rs. 3 per maund. Prior to the depression the area under jute cultivation was about 3,000,000 acres and the yield was round about 10,000,000 bales—exports ranging around 4,000,000 to 4,500,000 bales and the consumption of Indian mills was between 5,500,000 and 6,200,000 bales. In 1932-33 exports had come down to 3,500,000 bales while the Indian mills could not consume more than 4,200,000 bales.

It may not be difficult to understand how rural indebtedness has gone on increasing rapidly during the last few years. How then can the debtor be expected to take advantage of the facilities which a co-operative credit society—bank or union—can offer him unless he is rid of the indebtedness from which he has no escape? How can he enter such a society and how can the society take him in? The question of previous debts was discussed in the Resolution (No. 12—287—I dated Simla the 17th June, 1914) of the Government of India. The decision the Government of India arrived at then, i.e. twenty years ago, was stated thus:—

“A question is in this connection sometimes raised: should a member be admitted to a society who is not free from outside debt? The only answer that experience admits of being given is that until a member has been freed from outside debt a society is not performing its full functions, but it is a counsel

of perfection to expect that no one shall be admitted as a member unless and until his outside debts have been paid off. There are, of course, extreme cases in which a man is so indebted that there is no hope of his debts ever being cleared off, and in such a case the proper course is to refuse him admission to the society. But there are many cases, including some that at first sight may appear hopeless, in which the societies can do much. The *panchayats* in charge of societies have in many cases undertaken the part of conciliators, and, by offering immediate payment, have secured considerable remissions of claims from creditors. A full disclosure of existing debts is a necessary preliminary to admission and there is sometimes in practice considerable difficulty in ascertaining the full extent of a member's unsecured debts, but proposals have been put forward of investing the societies with power to call on creditors to file claims by a fixed date on pain of lapse, and if these should be approved, societies will be materially strengthened in dealing with the outstanding debts of their members. It is indeed to co-operation, more than any other measures, that recourse must be had in the attempt to solve the difficult problem of rural indebtedness in this country, and co-operation has advantages which most of the schemes put forward with this object do not possess. It is applicable not only to the classes which possess land but also to others. It makes it possible to reduce outstanding debt without extravagant expenditure of public money. And what is most important of all it ensures that the debtor, when cleared of debt, shall be put in a way of life which discourages debt and thriftlessness in the future."

The arguments advanced are unobjectionable but the gradual change for the worse which has taken place during the last twenty years, specially since the setting in of the economic depression, and which is to a great extent responsible for quite a number of societies being on the high road to insolvency has made matters extremely complicated. The societies have not been endowed with the power to conciliate debts, nor are they in a position to induce the debtors to a reasonable attitude. In most cases debts have mounted up to amounts which cannot be

realised by the sale of the debtor's assets, which can be seized hold of or put in as security.

Under the circumstances the solution of the problem of agricultural indebtedness cannot be made to depend upon the co-operative credit societies alone. Other remedies in addition have to be found.

Sir John Anderson hits the point rightly when he indicates that a comprehensive scheme for the reorganisation of the rural economy of the Province should include such measures as

(a) A comprehensive scheme of *debt conciliation* with which may be coupled provisions on the lines contemplated by the Indian Banking Enquiry Committee for *compulsory adjustment* of accumulated debts under some suitable judicial procedure which will guarantee fairness ;

(b) A *rural insolvency* procedure of a simple and inexpensive nature ;

(c) The establishment of a system of land mortgage banks to solve the problem of long term credit facilities ;

(d) The development of co-operative institutions on lines designed to avoid the defects that have become apparent in the existing movement.

It is apparent that unless and until all the measures are taken, the end will not be achieved.

It may be mentioned in this connection that there is a certain section of opinion which will favour a complete repudiation of the debts by the agriculturist. The suggestion seems to be highly attractive specially at the present moment when one frequently hears of talks about cancellation of War debts. But we are inclined to think that such a step will not at all be wise. It will upset the whole basis upon which the present day society is built. The sanctity of contract will disappear and confidence will be rudely shaken. There are, moreover, a few points to be taken into account. If all debts are cancelled, the agriculturists will not be able to secure fresh loans from the same creditors, their doors will be barred against them, and as

co-operative institutions cannot be established all over the Province overnight, their position will be rendered extremely difficult. It is also possible that many holders of the mortgages are not the original creditors but acquired them subsequently, and in the event of cancellation, as unwary and unsuspecting transferers, they will be unnecessarily penalised. Lastly, if relief is to be granted to the agriculturists at the cost of the landholders and *mahajans*, in order to be fair, some sort of compensation must be granted to the latter.

Debt conciliation.—Debt conciliation can be done voluntarily or by legislative enactment, and when there is a legislative enactment to fall back upon it is always easier to induce people to the voluntary method. If we have quoted at some length from the Resolution of the Government of India it is because it discloses the dangers as also the strong points of the existing machinery. It has been said that the *panchayats* in charge of the societies have, in many cases, undertaken the part of conciliators. Their work, however, has not progressed very far. It shows the need of a properly organised machinery for debt conciliation which will have the sanction of law behind it. The Government had fought shy of reducing outstanding debt with extravagant expenditure of public money. But that risk has to be undertaken and with it steps to minimise the expenditure. Debt Conciliation Boards with statutory powers of law courts to enforce their decisions should be simultaneously started, one in each Union Board. In extreme cases where the creditors will not agree to any remission by voluntary compromise, there should be compulsory settlement of debts by the courts which will be empowered to make compulsory awards on the petition of the debtors. The provisions of the Bengal Money Lenders' Act passed in 1933 should be rigidly enforced by the courts in this connection.

The most important point to be kept in view in connection with all these cancellations and conciliations is the relation between the present price level and that of the date when the debt was contracted. But under no circumstances should the debts be permitted to be reduced below the equivalent figure

justified by price changes. The following table of price index may serve as a guide in the matter :—

				1914=100
				Index number of whole-
				sale prices
1924	...	...	...	173
1925	...	...	...	159
1926	...	...	...	148
1927	...	...	...	148
1928	...	...	...	145
1929	...	...	...	141
1930	...	...	...	116
1931	...	...	...	96
1932	...	...	...	91
1933	...	...	...	87
May, 1934	...	...	...	90

The cost of living and retail price index ought to be a relevant figure in connection with debt. Cost of living figures are not available, but the above gives an indication.*

Rural Insolvency Legislation.—The Agricultural Commission had to admit that existing enactments are insufficient. "Relief from debt, whether inherited or incurred by the individual himself, can be sought in the provisions of the Provincial Insolvency Act but those provisions are of little benefit to agriculturists, partly because they cannot be utilised except in cases of indebtedness amounting to Rs. 500 and partly because the courts are disinclined to allow the benefits of the Act to the landholders whose rights are protected from sale in execution on the ground that such persons are not insolvent within the meaning of the Act." The law, moreover, lacks the element of special adaptation to land tenures and specially to the case of non-transferable holdings. The conclusion arrived at by the Commission is a most sensible one: "Legal technicalities must be subordinated to economic interest and, in view of the evidence . . . of the unsuitability to agricultural conditions of the existing insolvency law . . . the case of a simple

* See Supplementary notes in the Appendix.

Rural Insolvency Act should be carefully considered. The main object of such a measure would be to relieve the debtor of what he cannot pay, whilst insisting on his paying the utmost he can 'within a reasonable time.' This is the principle which should guide us in approaching the whole question. A Provincial Rural Insolvency Legislation should be undertaken without avoidable delay.

A Rural Insolvency Act will be of immense benefit to those agriculturists whose debts exceed the value of their assets. In these cases the enactment of such a law will provide for the repayment of their debts as far as possible by the sale of their holdings, relieving them of the rest of their indebtedness. The town dwellers now may declare themselves insolvent and enjoy all the privileges allowed under the Act. There is no reason why their poorer brethren, the village agriculturists, should not enjoy similar privileges. Poverty or inability should not be allowed to stand in the way of their beginning life afresh, a privilege to which every human being is entitled, rich or poor, urban or rural. In administering the Rural Insolvency Act, however, great care should be taken, so that, the means of livelihood of the agriculturists may not be tampered with or jeopardised. It is not desirable that their cattle, tools and implements and dwelling places should be sold out to meet the claims of their creditors, for that would render them absolutely destitute and prevent them to earn their livelihood even by working as wage earners. At the same time no injustice should be done to *bonafide* money-lenders.

One problem that arises from the application of the Insolvency Act should be noticed here. Mr. Sarkar points out that as a result of its application a large number of agriculturists should have to work as wage earners on other peoples' lands. But will it be possible to absorb all of them? If the number of such agriculturists becomes too large to be absorbed in this way, new avenues of employment will have to be explored for them; and industry, both factory and cottage, is the only suitable channel through which this huge mass of landless labourers may be absorbed.

Simultaneously with debt reductions, organisations are to be set up to help the agriculturist so that he may not incur unproductive loans again and that he can meet all his obligations, both recurring and capital from his resources. Facilities no doubt have to be created for him so that he may create capital. We must turn to co-operative credit institutions for all these, to land mortgage banks for long-term capital and to co-operative societies for working capital. At a later stage, other institutions on the same basis may be founded for granting intermediate credit extending over 1 to 5 years.

Co-operative credit Institutions.—Long before the existing societies were contemplated, as early as 1891, the late Mr. Ranade said, "No fact in the economic condition of this country arrests attention more forcibly than the contrast presented by the hoards of unused capital, stored up in the vaults of the Presidency and other exchange banks, and the high premium Government securities command on one side and on the other the utter paralysis of industry in rural India, due to the poverty of the resources of the classes engaged in the production of wealth." He referred to what seemed to him to be an impenetrable barrier intercepting the outflow of wealth and barring the channels of communication between the reservoirs of capital and the parched fields of industry, dried up for want of wealth bearing and fertilising moisture. He advised the Government to organise district or city committees of Indian capitalists and empower them to receive deposits at fixed rates, and lend them at slightly higher rates to borrowers on proper security, the excess rate providing for a gradual conciliation of the debt in a definite period as also insurance charges and working expenses.

This idea has been worked out in the co-operative movement. A comprehensive organisation may be suggested to be as follows :—

- (a) The establishment of a Central Bank in which money will be received as deposits giving a reasonable interest,
- (b) The establishment of District Banks which will receive

money from the Central or Provincial Bank as and when necessary on a slightly higher interest,

(c) The establishment of Co-operative Credit Societies in every sub-division under the District Banks,

(d) The establishment of Rural Co-operative Credit Societies in each Union.

The rural society in each Union will be in immediate and constant touch with the people, their needs, and above all, their standing and ability to repay. It will advance money to the cultivators after proper investigation seeking and utilising the help of Debt Conciliation Boards or the law courts to start the cultivator on a new life. The work is so noble in its nature that it may be expected that it will attract philanthropic men and women of the type of Raiffeisen. Though sick and nearly blind, he devoted his life to the work of rural reconstruction. "Nature had proved a veritable step-mother to the inhospitable bit of territory ; he began his work,—upon which the half-starved population,—ill-clad, ill-fed, ill-housed, ill-brought up—by hard labour eked out barely enough to keep body and soul together, with the support of the scanty produce of their little patches of rye, buckwheat, or potatoes and the milk and flesh of some half-famished cattle, for the most part ruinously pledged to the Jews." Such was the condition of the country and of the people where Raiffeisen set to work. And the conditions of the problem were not dissimilar to those we find in Bengal, viz.

(1) to infuse *within*, confidence, courage, the spirit of thrift, of self-help and of mutual help through association to a peasantry so enfeebled, suspicious and dispirited and

(2) to inspire *without* such confidence and credit that upon the guarantee of such a peasantry, external capital should be attracted in sufficient quantities to free the peasants from debt, and to supply them with funds for maintenance and production.

Raiffeisen did it. Let us hope men will not be wanting in Bengal,—men like Ruskin's Captains of good leading—to do it also and do it equally well.

Let us hope that these "Captains of good leading" will be available among our educated classes mindful of the respon-

sibilities of education and patriotism. They will supply the real needs of the agriculturists through the societies, make them men, teach them modern methods of agriculture, make them conscious of their combined power. And rural indebtedness will disappear as does the darkness of night before the radiance of dawn.

These village Societies will be the last link in the chain of organization, at the other end of which will be the Central or Provincial Bank which will act as the fountain head.

The time is propitious. The depression has brought about a condition in which the creditor is willing to get his money back and forego a reasonable portion of it, as the value of property has decreased. The unemployment in the country will make the services of competent men, ready to work out the scheme, easily available and on moderate remuneration.

His Excellency the Governor has said, "Money will have to be found. I can promise that it will be found, for money spent for the purpose . . . will be money well spent, bringing an adequate, indeed an ample return." It is a matter of great satisfaction to note that His Excellency Sir John Anderson's Government have already taken the preliminary steps.

Rural reconstruction has now become the charge of a special officer in Bengal and his duties have been defined in a Press Note announcing the creation of the post of a Rural Development Commissioner. The problem he has to solve is that of the reorganization of the rural economy of the Province, a problem which presents many features which are normally the concern of the different Departments of the Government. It is not the intention of the Government that the distribution of work among the different Departments should be disturbed. The Rural Development Commissioner, in handling a particular problem, will work in close collaboration with the Departments concerned and will, where necessary, assist in the co-ordination of the activities of the different Departments without derogating from the responsibilities of the Heads of Departments and Ministers concerned. The problems which the officer will be required to handle are many, and the various suggestions for

the improvement of rural economy will come in for review. As an instance it may be mentioned that "one of the most important problems that will engage his attention is rural indebtedness in the Province, and he will have to consider the various suggestions for its solution with a view to the evolution of a plan, designed to lighten the burden of rural indebtedness and to build up a sound system of agricultural finance."

Mr. Jack in his *Economic Life of a Bengal District* made the following calculation of the expenditure incurred by a family of five (two adult males, one adult female and two children) in Bengal:—

Items of Expenditure.	Amount spent annually by a family in comfort.	Amount spent annually by a family in extreme indigence.
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Food

	Rs. A.	Rs. A.
Rice ...	120 0	60 0
Salt ...	2 0	1 8
Oil ...	6 0	3 0
Spices ...	2 0	1 0
Fish ...	5 0	0 0
Vegetables ...	7 8	1 8
Milk and ghee ...	3 0	1 8

Other necessities

Kerosine oil ...	2 0	1 0
Tobacco and Molasses	2 0	0 12
Betel nut ...	3 0	1 0
Clothes ...	25 0	9 0
Household utensils ...	1 0	1 0
Petty house repairs ...	5 0	1 8
Furniture ...	3 0	1 8

Miscellaneous

Rent ...	25 0	4 8
Local taxation ...	1 8	0 12
Medical treatment ...	5 0	1 8
Purchase of cattle ...	8 0	(hire) 1 8
Purchase of boat ...	1 0	0 0
Thorough house repair	8 0	3 12
Domestic festivities ...	15 0	3 12

of Rs. 50 per head in the first case and Rs. 20 in the second. This calculation still holds good.

The suggestions include, according to the Government, among others

- (1) Scheme of debt conciliation on a voluntary basis ;
- (2) The compulsory adjustment of existing accumulated debts ;
- (3) A rural insolvency procedure simple in form ;
- (4) Measures designed to protect the agriculturist against the evils of extravagance in borrowing ;
- (5) Land Mortgage Banks (an experiment has already been decided upon) ; and
- (6) The creation of an organization of approved credit institutions designed to provide the major part of the credit required by the agriculturist.

With methods of debt conciliation, compulsory adjustment by courts where it cannot be voluntary, suitable judicial procedure for rural insolvency and a chain of co-operative organizations, the higher working through the lower, rural indebtedness will disappear sooner than we can anticipate, while every interest will be fairly dealt with and we shall find the future flashed with the radiance of a dawn gradually breaking into a brighter day than has ever yet shone on the Province.

CHAPTER VII

AGRICULTURAL FINANCE

In formulating any scheme for the agricultural recovery of the Province, a great deal of attention must necessarily be directed towards the proper solution of the problem of agricultural finance. In a country so essentially and predominantly agricultural, the finance at the back of it must of necessity be well regulated and carefully planned. And because of the very nature of the farm industry, the financing of agricultural operations requires three kinds of credit, (i) short term, (ii) long term, and (iii) intermediate. The first form of credit is identical in nature with the working capital of industrial enterprises and is necessary to finance the preparation and movement of crops. It is definitely a temporary accommodation and should be repayable at the time of the next harvest, or at the most, the harvest after the next. The second is directly analogous to the fixed capital of industrial concerns, by way of a more or less permanent and fixed charge which is required for providing the capital for the purchase and development of the land. Its duration is usually fairly long and often covers a period of twenty years and sometimes more. The third class or intermediate credit lies midway between short and long term credit from the view-point of duration and has a currency of from six months to three years in time. This type of credit is convenient for the farmer, and is required by him to obtain the capital necessary for the purchase of implements and live-stock and for making small improvements to his farm. Rural credit societies are admirably suited to furnish the first form of credit. But by the very nature of their constitution they are precluded from supplying the second. The long term credit for land improvement, as a Parliamentary Blue Book on Agricultural Credit in Germany points out, should be of an adequate amount, should bear a moderate rate of interest, and should not be liable to be called in, while sinking fund payments should be made

obligatory. The resources of the village societies, as these are at present constituted, are not only too slender to embark on this kind of business, but they are also definitely of a short term character. It will be uneconomic and opposed to all principles of sound finance on their part to lock up their short term funds in the long term financing of agricultural operations. Private capitalists would hardly find it to their interest to invest their money for such a purpose and on such conditions; they are not usually qualified nor have they the means or the inclination to investigate the plans and probable return of such improvements. They are also not in a position to supervise the property or its management at a later period. Seldom do we come across, in our everyday business life, a private capitalist or an ordinary commercial bank ready and willing to waive the right to call in a loan or to accept payments in instalments spread over several years. For all these reasons, special machinery must be devised and set up for furnishing this type of credit admittedly best suited for agricultural and industrial developments. The importance of providing adequate long term financial facilities to the agriculturists has been frankly recognised in every civilised country of the world. It was Germany which first utilised with remarkable success, the machinery of the mortgage bank to meet the long term needs of agriculture. The mortgage bank is a specialised institution granting long term amortisation loans on first mortgages of agricultural property. The funds for financing its operations are raised by the issue of debentures. The insistent and widespread demand for long term agricultural credit and the advantages of the mortgage bonds as the means of supplying it have led to the establishment of specialised institutions in every important agricultural country. Three main types of agricultural mortgage banks have been evolved—*co-operative*, *joint stock* and *State*.

In Germany the original mortgage banks, the *Landschaften* as they are called, were followed by the new *Landschaften* and other modifications gradually emerged. The idea rapidly spread to other countries of Europe and even to South America.

There is scarcely any progressive country in the civilised world to-day which does not possess its own mortgage bank for financing the long term needs of agriculture. Not only newer countries like Rumania, Poland, Greece, Jugo-Slavia, Bulgaria but even Palestine and other countries have taken or are taking steps to have mortgage banks. Their working is keenly watched and the success of some of them is far too tempting for other countries not to take notice of. Those, therefore, which do not have them, even older and slow moving countries where any such organisation did not previously exist, are taking every necessary step to organise special machineries for furnishing long term real estate credit, in other words, the introduction of mortgage banks on long term basis. Thus Great Britain, where little attention had hitherto been paid to this aspect of agricultural finance, was at last induced to pass an Agricultural Credits Act in 1928. The outcome of this legislation was the formation of the Agricultural Mortgage Corporation which has been organised on a joint-stock basis, a departure being made from the co-operative principle of land mortgage banking.

While it is found that in practically every country old or new, a great deal of interest is being taken in organizing this form of agricultural credit, the question does not appear to have received the attention it deserves in a pre-eminently agricultural country like India. The co-operative credit societies have to some extent solved the problem of short term credit. But the problem of long term credit remains as acute as ever. In some provinces of India, a few land mortgage banks have indeed been started but they have touched only the fringe of the problem. The lack of financial accommodation for fairly long periods still remains one of the greatest difficulties confronting Indian agriculture. The problem in Bengal is as acute as anywhere else in India. Out of the 100 crores of agricultural debt estimated by the Bengal Banking Enquiry Committee not only the whole of the secured debt of 44 crores is long term but quite as much of the unsecured debt of 49 crores is of similar currency. But in the past no organised effort appears to have been made to solve this problem. It is only in very recent

years that land mortgage banks have been started in the Province. The one at Naogaon in the District of Rajshahi commenced business in 1925 and another at Bhola in 1927. Three more banks have come into existence in the course of the present year at Comilla, Mymensingh and Pabna. According to the bye-laws, the Naogaon bank may lend up to 20 years and the Bhola bank up to 7 years. It is inconceivable that although the major portion of the loans made by the Naogaon Bank was for a period of more than 5 years there were no provisions for the issue of debentures for raising the necessary funds. The unsound character of the system pursued by the Bank was recognised by the Co-operative Department. To remedy the mistake the Bank was subsequently empowered to issue debentures, of which the Bank has hitherto taken no advantage. So, this is all that has been done until now in this direction. It is quite evident that the existing financial facilities fall far short of the needs of the Province. Thus it appears that the importance of the question of long term credit has been hardly adequately recognised. It was left for His Excellency Sir John Anderson, who has always taken the keenest interest in the economic recovery of Bengal, to draw pointed attention to the supreme importance of the problem in his memorable speech of the 30th November 1933. After referring to the necessity of an intensive drive against the existing burden of rural indebtedness, His Excellency observed that an attempt should be made "to build up for the future a sound system of agricultural finance in the interest not of the tenant merely but of all who constitute the fabric of our rural society." The establishment of a system of land mortgage banks was specifically referred to by him in this connection.

The principal object of the Land Mortgage Banks in Bengal has been stated to be to supply long term credit to substantial cultivators, small landowners and rent receivers and other persons of limited means for the purpose of

- (1) Redemption of mortgages on land and liquidation of prior debts,

- (2) Improvement of land and methods of cultivation,
- (3) Purchase of land in special cases on condition that such purchase will enable the raiyat to round off his holding and work it more economically.

As we have said in the previous chapter, the cultivators are heavily indebted and not even the fringe of the problem will be touched till this question of rural indebtedness is successfully tackled. It will require large resources, a portion of which will be necessary for the redemption of debt and another for improvement of land and methods of cultivation. Unless the loan is of an adequate amount, it would not suffice to serve the purpose of improving the land and the methods of cultivation after the redemption of mortgages of lands and the liquidation of other prior debts. The main purpose, therefore, will not be served. In a scheme of this nature it is of the utmost importance that the Bank should have the necessary machinery at its disposal qualified to advise and supervise the improvements in land and methods of cultivation.

It has been decided that persons receiving loans need not be members of existing co-operative societies, but they must be members of the Land Mortgage Bank. The capital of the Land Mortgage Bank will be raised by sale of shares to members, whose liability will be limited to the nominal value of their shares. But the capital thus collected may not prove sufficient, at least at the beginning. Consequently it has been provided that it will be permissible for the Bank to borrow to the extent of 20 times its paid up value of shares plus the reserve fund, for the time being separately invested. This money will be advanced by the Bengal Provincial Co-operative Bank, Ltd., to which all the Land Mortgage Banks will be affiliated till a Central Land Mortgage Bank is established and the Co-operative Bank will raise the amount by issuing debentures. The interest on the debentures will be guaranteed by the Government during their currency, the guarantee of interest being limited to debentures of a total value not exceeding Rs. 12½ lakhs. The guarantee of the Government will have the effect of creating confidence. This was evident in the case of the Bengal Pro-

vincial Co-operative Bank. The failure of the jute societies and the advent of adverse economic and financial conditions threatened possible danger to the Bank in 1931-32. The Government gave a guarantee to the grant of a cash credit up to Rs. 30 lakhs by the Imperial Bank of India in favour of the Bank, but it was not necessary to utilise this credit. Bengal is a poor country and capital here is proverbially shy. The experiment also is quite new. Under the circumstances the decision of the Government to guarantee the interest on the debentures referred to above and also to provide a sum of Rs. 40,000 to give the Land Mortgage Bank scheme a start will doubtless give the movement a great impetus, and what is more serve as an indication of the Government's sincerity of purpose. The Provincial Co-operative Bank will function through a Land Mortgage Department which will be kept separate from the other Departments of the Bank. This is of course a passing phase. As soon as the Central Land Mortgage Bank is established for the Province, all mortgage banks are to be affiliated to them.

In Bengal elaborate and necessary precautions have been taken against loss. Loans are to be granted to members up to twenty times the paid up value of shares paid by a member subject to a maximum of Rs. 2,500 which in special cases may be extended to Rs. 5,000 with the sanction of the Registrar of Co-operative Societies. No loan will be granted exceeding 50 per cent. of the market value of the land hypothecated and 75 per cent. of the total income derived from the land during the period of loan. No loan will be granted to a member who, from his agricultural income, is unable to pay the interest and instalment of the principal keeping sufficient margin for his maintenance. Loans will be secured by first mortgage which may be with or without possession. In addition to this mortgage every borrowing member will have to furnish two member sureties. The period of loan shall not exceed twenty years and loans will be recovered by instalment or annuity method.

Nor is this all. Every effort will be made to ensure

punctual repayment of instalments as they fall due and in order that borrowing from outside may be regulated a borrowing member will be under the obligation of furnishing annually a statement of his debts ; borrowing from other Co-operative Societies or other outside sources for short term purposes is permitted only with the previous sanction of the Bank.

The precautions will, however, mean that only well-to-do cultivators will be able to take advantage of the facilities to be offered by the Land Mortgage Banks. But the well-to-do cultivators are a microscopic minority in Bengal, the vast majority consisting of ignorant men groaning under a load of debt, eking out a narrow and penurious if not a precarious existence. They are men "living a life of chronic starvation and of the most abject ignorance, grim and silent in their suffering, without zest in life, without comfort or enjoyment, without hope or ambition, living because they were born into the world, and dying because life could no longer be kept in the body."

How will it be possible to reach them and how to take the fertilising waters of the new organisation to them?

Then again the Bank will have to organise a complicated machinery under various experts to assess the probable income from the land before and after improvement, to ascertain the financial position of the borrower, his capacity to repay, his reliability, etc., as also to examine the plan of improvement which may be undertaken.

Will not the work be simplified if the Banks decide to work not directly but through local organisations formed for the purpose? The Banks may advance money on necessary security to these local organisations which would be in a far better position to scrutinise investments than the Banks themselves.

Our idea of a local organisation is that it should be a comprehensive organisation. There are going to be Land Mortgage Banks for finding fixed capital, co-operative societies for working capital and another type of organisation, when time comes, for intermediate credit. All these will be separate bodies up to sub-divisional head quarters. But the local or the

village organisation should be one and a single body, which must be affiliated to all the above organisations in the sub-division. The local organisation must have separate departments and separate accounts for all these different kinds of work. As we shall see later on, some form of marketing work also is to be given to these bodies. In a village or an Union Board it is not possible to get adequate number of responsible men for running 3 or 4 separate institutions and that is why we prefer that these different kinds of work should be carried on under one management.

It has been stated that the Banks make it a condition of a loan that the borrowing member shall use seeds, implements, etc. and also sell his produce through such sale agencies as the Board of Directors may direct.

The local organisations will be better fitted to do this work, i.e., to establish and control depots for the supply of seeds, implements, etc. as also for the sale of produce in collaboration with suppliers of seeds, machineries, etc., and the central sale organisations or wholesale dealers in the market towns.

The local societies are a distinct advantage to the cultivators and landholders when they undertake to supply goods to members. It was found in a highly educated country like Germany that despite all the efforts of the Chamber of Agriculture and of the other numerous organisations that ceaselessly warn and advise agriculturists on the point, individual purchasers are still only too frequently supplied with goods of inferior quality. Dr. Grabein has given many instances of such cases. In one season there was sold in a district cotton seed meal which, instead of containing the normal 50 to 60 per cent. of proteins, proved to contain 34.11 per cent. only. The price was about the same as for the normal article, so that the dealer made an extra profit on it of about 80 per cent.

If such cases can occur in a country like Germany, where primary education is free and compulsory and where Chambers of Agriculture and similar other organisations are always at

work advising agriculturists, the danger of dishonest dealers deceiving the ignorant and credulous agriculturists of Bengal is apparent. That is all the more reason why local organisations should be established to undertake the supply of seeds, manure, implements, etc., to the agriculturists who become members. These organisations not only charge lower and nominal prices but also introduce a further element of cheapness by the superior productivity of good manures, feeding stuffs, seeds and other things. Even those farmers who do not belong to a local organisation reap advantage from its existence, as it exercises a salutary effect upon the ordinary dealer's methods of business both as regards price and quality of goods.

If such organisations are financed by the Banks, mortgage, co-operative and intermediate, which also undertake to examine their investments and accounts the Banks' risk also decreases.

The principal functions of such organisations will be

- (1) to meet the needs of their members for supplementary personal credit or working capital,
- (2) to promote thrift among the rural population,
- (3) to act in general as the village bankers.

The point which we are trying to stress is that Land Mortgage Banks as designed cannot reach the average agriculturist. We would suggest that there should be a Central or Provincial Land Mortgage Institute for the whole of Bengal. To this Central Institute will be affiliated District Land Mortgage Banks which might work through branches in the different sub-divisions. To these sub-divisional branches are to be affiliated the village local organisations. These local organisations, preferably on the co-operative principle, have to be established to reach the average agriculturist. They will be financed by the Land Mortgage Banks and Co-operative Societies which will be in a position to help directly only well-to-do agriculturists or rent receivers or other persons of limited means who take to agriculture.

The local organisations which will be the real approved credit institutions to provide the major part of the credit required by the agriculturist will be managed by local directors

under the direction and supervision of representatives or Inspectors appointed by the Land Mortgage Banks, and Central Co-operative Credit Societies, and intermediate credit banks to all of which it will be affiliated—the Banks and the local organisations being two links in a chain of institutions formed for the purpose of re-organising agricultural finance in Bengal.

The question whether the land mortgage bank should be organised on a joint-stock or a co-operative basis has been frequently discussed, and a brief comment is, therefore, called for. The type of joint-stock mortgage bank which has captured the imagination of our countrymen is the Agricultural Bank of Egypt. Prominent publicists and economists have often proposed that a land mortgage bank should be patterned after the Egyptian model. But the history of the Egyptian institution has been singularly unhappy and should prove a conclusive argument against the adoption of that model, at any rate without circumspection. We agree with the Bengal Banking Enquiry Committee when they say that a joint-stock land mortgage bank providing cheaper and more facile credits than those of the existing institutions will not be suitable for the needs of the Bengal farmers. Land Mortgage Banks on co-operative principles will best answer our purposes.

There is another question, that of the Centralised Mortgage Institute vs. the Decentralised Mortgage Institute. In Madras the land mortgage banks have issued debentures independently but in Bombay and the Punjab they have issued their debentures through the Provincial Land Mortgage Banks. The decentralised system has undoubtedly certain advantages in-as-much as a National Centralised Institute cannot be expected to possess a detailed knowledge of the local conditions. But the most important consideration that may be urged in favour of a Central Bond Issuing Institute is that a large national organisation will be more likely to command the confidence of the investing public. The bonds of the Central Institute will be more readily sold than those of a small district bank. The Provincial Land Mortgage Bank in Bengal might be

ultimately federated, along with similar institutions of the other provinces, into an All India Mortgage Bank.

While it must be admitted that the establishment of land mortgage banks in Bengal will fill up a gap in the existing machinery of agricultural finance, it should be pointed out that the question of providing facilities for intermediate credit to the cultivators has scarcely received any attention in the country. Special institutions have been called into being in a number of Western countries to provide these facilities to their farmers. It was in the United States that a comprehensive system was first established for the purpose. Under the Agricultural Credits Act of 1923, twelve Federal Intermediate Credit Banks were founded in the twelve Federal Land Bank districts, with head-quarters in the same place as the land bank. They are Government institutions and the capital stock of \$5,000,000 was subscribed by the Secretary of the Treasury. On the basis of their general assets and joint liability, they issue and sell three to five year collateral trust debentures. These banks cannot deal directly with individuals but have been authorised to lend and offer re-discount facilities for periods of six months to 3 years to co-operative marketing associations, agricultural credit corporations, livestock loan companies, state and national banks. The security required is mobile assets. The following types of paper are rediscounted by them :—

- (1) Notes on livestock endorsed by cattle companies,
- (2) Notes issued by co-operative marketing associations,
- (3) Agricultural notes endorsed by a bank or some other agricultural credit corporation.

The loans are used partly as working capital in financing the annual crops and in part as investment capital spent on fertilisers, cattle, fruit trees, etc. The success of the American system of intermediate credits has created a desire for the establishment of similar machineries in a number of agricultural countries of Europe. The desirability of raising three to five year bonds in the foreign capital markets was stressed by the

Warsaw Conference of Central and East European Powers in 1930.

The necessity of some machinery for furnishing intermediate credits to the Bengal farmers cannot be too strongly emphasised. Natural conditions affecting agricultural production and marketing require that a considerable portion of agricultural loans must run for periods of six months to three years. While long term credits are required for the rationalisation of the productive and marketing processes, intermediate credits are indispensable to prevent produce being forced on to the market at unduly low prices in certain periods. In America the greatest service has been rendered to the co-operative marketing associations and cattle loan companies by these Intermediate Credit Institutions. In Bengal, too, the possibility of organising a suitable machinery for furnishing intermediate credit should be carefully investigated. Such a machinery, if established, will doubtless go a long way towards the economic regeneration of the Bengal cultivators.

We have already stated that the co-operative credit societies have to some extent removed the difficulties which the farmer previously experienced in raising his short term finance. But it would be remissness on our part if we were to refrain from pointing out the many defects from which the system of agricultural financing through the medium of the village societies is suffering. Unless these defects are remedied, much of the benefit obtainable from the scheme of land mortgage banks and intermediate credit institutions will be neutralised. The main defect of the present system of co-operative financing lies in the failure to distinguish properly between loans for crop requirements which should be repaid at harvest time, and loans for the liquidation of debts or land improvements, the repayment of which naturally takes a much longer period. The remedy lies in a wider and more extended adoption of the distinction between long term and short term loans, the granting of the former for land improvements being considered to be the function of the mortgage bank only. Another defect of the existing system is its rigidity and the supply of

money to village societies in a manner too piecemeal and inelastic for the continuous and fluctuating demand of the cultivators. A society may get a loan from its Central Bank for its normal requirements at a particular season, but the next moment unforeseen demands may arise and if the members do not get promptly the financial accommodation they require, either their agricultural operations are retarded or they fall back upon money-lenders. The remedy lies in the adoption of the system under which Central Banks will allow cash credits to village societies against which they will operate by means of cheques.

From preceding discussion it is abundantly clear that, in any programme for the agricultural recovery of the Province, interest has to be focussed on the proper solution of the problem of agricultural finance. The various issues arising out of this problem have already been presented and may be stated here succinctly. The agriculturists, we have seen, require different kinds of credit and steps must simultaneously be taken to provide adequate facilities for each of these different requirements. The Land Mortgage Bank will undoubtedly solve many of the problems of agricultural indebtedness, but it should never be considered to be the panacea for all the ills that the agriculturist is heir to. The provision of short term and intermediate credit facilities is as much a matter of urgent importance as that of the long term. There must be a harmonious development of facilities for each of these three types of credit. The Land Mortgage Bank, the Intermediate Credit Institution, the Co-operative Credit Society, these are the three important links in this chain ; and the weakness of one link must lead to the snapping of the entire chain. Then again it must be remembered that the proper functioning of the land mortgage bank will depend to a great extent upon the success with which the local societies referred to above are organised. We have already given an outline of the structure and functions of these local organisations ; the details need only be filled in. If an attempt is made to tackle the problem along the lines as indicated above, we are confident that not only will the existing

burden of agricultural indebtedness be considerably lightened but the farming industry itself will enter into a new era of progress and prosperity. Finance is the life blood of every industry and an adequate and orderly supply of finance must first of all be ensured for the basic industry of the Province before we can think of its economic recovery.

By way of illustrating the principles we have been at pains to enunciate in the foregoing pages a suggestive constitution is given in the Appendix to serve as a model for any proposed Bank.

CHAPTER VIII

CO-OPERATION

"If the system of co-operation can be introduced and utilised to the full, I foresee a great and glorious future for the agricultural interests of this country."

Nowhere were the possibilities of the application of the co-operative principle in the development of this country better, more perfectly and more tensely expressed than in the words quoted above—words uttered by His Majesty the King-Emperor in 1911.

Co-operation in its modern form is of recent origin in this country. The first law was enacted in 1904 and permitted the formation of co-operative credit societies, with a view to grappling with the problem of rural indebtedness. The Act received the assent of the Governor General in Council on the 25th March, 1904, and on the 29th April the Government of India issued a resolution explaining, for the information of their officers and the public at large, the considerations by which they had been influenced in framing the provisions of the Act and indicating the principles in accordance with which they desired the Act should be worked. Provincial Governments were directed to select districts for the working of the Act, to appoint Registrar, and to frame rules under which he was to work. The first Registrar of Bengal was appointed on the 6th September 1904 who took over charge of his duties on the 25th October of the same year.

The urgency of helping the cultivators by advancing money on easy terms had been rudely brought home to Government by the peasants in the Deccan rising in revolt. A Commission was appointed in 1870 to enquire into the causes of the Deccan riots, and they reported :

"We have endeavoured to show that the normal condition of the bulk of the *ryot* in the disturbed districts is one of indebtedness".

The Deccan Agriculturists' Relief Act of 1879, though passed for a special purpose, was really the precursor of a number of measures intended to give aid to the cultivators by advancing money on easy terms. The value of these Acts was considerable. Yet we have it on the authority of a well-known publicist, Mr. Lovat Fraser, who was of opinion that they had the defects inseparable from purely State aid, that rather than face the stringent regulations with their delays and the inevitable vails, the peasants still often preferred to borrow from the village *mahajān* or money-lender. The time had come when the rural classes had to be shown how to work out their own financial salvation. In October 1900 a Bill, tabled at Lord Curzon's instance, dealing with land alienation in the Punjab, became law, and the Governor General summed up the result of the measure when he said that Shylock could no longer take his pound of flesh in land. But it remained to imbue the cultivator with those principles of self-help of which he stood, and unfortunately stands till now, so sadly in need. At times he required access to capital in order to purchase seed or implements, to effect improvements in his land, and to tide over bad seasons. It was good to have dealt a blow at the unscrupulous money-lender but he was still an almost indispensable adjunct to the village organisation. The Government never intended to destroy the honest money-lender of whose useful functions they were well aware. They only wanted to check dishonest money-lending. And it was highly desirable to supplement the money-lender, wherever possible, by furnishing the raiyat with an easier and cheaper means of obtaining capital in emergencies. Thus co-operative credit societies are intended to be different from Land Mortgage Banks and not to oust the money-lender who carries on his business with integrity and not to exploit the ignorant, the illiterate, the simple-minded and the needy. People interested in the welfare of the peasants of India had for years been trying to find out a satisfactory solution of the problem of agricultural indebtedness which was hampering the development of the principal industry of the country, the industry in which not less

than 80 per cent. of her population were engaged. Sir William Wedderburn, a genuine friend of India, had tried many years before, when he was attached to the Bombay Government, to start an agricultural bank at Poona. He was stopped, oddly enough, by Lord Kimberley, the then Secretary of State, who disapproved of the degree of State aid implied in the scheme. Sir Raymond West, afterwards a great judge of the Bombay High Court, published a scheme about the same time, with no better result. In 1892 Sir Frederick Nicholson was entrusted by the Madras Government with the task of drawing up a scheme of land and agricultural banks. His report was a masterpiece of laborious research, admirable in conception and execution, including a careful study of the co-operative institutions existing in Europe. It was duly published, and much discussed, but appeared likely to grow dusty on secretariat bookshelves. In 1900 Mr. H. Duperne, a civil servant, who had visited France and Italy to examine the co-operative popular banks in those countries, published an excellent little book entitled "People's Banks of Northern India." The views of both these capable public servants came under the notice of Lord Curzon, who was at that time casting about for further expedients to relieve the peasantry from their load of perpetual indebtedness. He saw in their proposals the solution he had in his mind and was actually looking for. They were called to Calcutta, and in due course a scheme of co-operative credit societies was started under the auspices of the great Viceroy who felt for the dumb millions of India such as he alone was capable of feeling.

It was intended to teach the man on the land one of the greatest of all lessons—how to help himself.

Lord Curzon devoted unusual attention to the scheme. He had the initial advantage of the monumental investigations of Sir Frederick Nicholson, who was so confident of the success of the movement that after his retirement he came back to India to encourage villagers in the south to start Co-operative Societies. Lord Curzon spent several months in consulting the provincial Governments and then had a committee appointed to

thresh the matter out. Further consultations with the provinces followed, and it was not until more than two years had been devoted to examine the question in all its bearings that the Bill was drafted. Still there were prophets of woe. Some of the Indian members of the Legislative Council were frigid, and declared that their countrymen did not possess the necessary spirit of co-operation. Even Sir Denzil Ibbetson, the member in charge of the Bill was a little dubious, and observed that he felt by no means certain of success. Lord Curzon said in his speech on the passing of the Bill into law that its object was "to foster a spirit of responsibility and self-reliance" and he made a stirring appeal to the Indian communities to use it for the benefit of the most deserving and helpless class of their countrymen. "Government has played its part. I invite them to play theirs" were his closing words.

Lord Curzon must have secured his inspiration not only from the advice of Sir Frederick Nicholson and Mr. H. Dupernex but also from the example of European countries like Denmark and Belgium. In Europe, the small farmers had been as much hampered by want of capital as the cultivators of India till they succeeded to partially overcome this difficulty by co-operation among themselves. The earliest examples of such co-operation in farming were usually associations to secure loans on more favourable terms than the local money-lender would grant, but the farmers who had discovered the advantages of association and had formed the habit of working together for a common purpose, soon extended the scope of their activity and discovered that they were able collectively to conduct a great many farming operations well which they had individually done ill. The benefits which spring from co-operation are of two kinds:

- (1) the stimulus to the small farmer to invest his savings and the discouragement of unproductive expenditure, and
- (2) the economic advantage of production on a large scale, and the employment of adequate capital.

It is to this co-operative movement among the peasants and small farmers that the agricultural revival in Europe is due.

"Perhaps the most striking example of the success of co-operation is to be found in Denmark. Half ruined by the Napoleonic wars, Denmark was still further crippled by the loss of her two fairest provinces in 1864 ; the sturdy Danish peasants set to work to repair their loss by reclaiming and bringing under cultivation the moor, marsh and dune land of which Jutland then so largely consisted. It was in the development of the dairy industry that the Danes first found the means of recovering from the crisis which had overtaken their economic and specially their agricultural conditions. The peasant-farmers of Denmark were in those days extremely poor, and individually they were not able to provide the capital necessary for scientific dairying. Their prosperity dates from the time at which they started co-operative dairies."

The first co-operative dairy was started in West Jutland in 1882. Twenty years after, i.e. in 1902, Denmark exported mainly to Great Britain 168,000,000 pounds of butter of the total value of £9,302,000 as compared with £8,950,000 in 1901 and £8,029,000 in 1900. The practice usually adopted was for about 150 farmers in a particular locality to raise, say £1,200 by subscribing £8 (Rs. 110) each, this sum being sufficient to provide a dairy to deal with the milk of 850 cows.

A network of co-operative agricultural societies has spread over almost every country of Europe and by association the farmers have been able to provide themselves with the use of capital which would be far beyond the means of any one of them individually. The consequence has been an enormous impetus to agriculture. The case of Belgium may be regarded as typical. It was not until about 1890 that Belgium began seriously to bestir herself with the view of effecting the reconstruction of her agricultural position. Yet in ten years the claim could be made for her that, relatively to her size, more associations had been established in Belgium than in any other country in Europe.

"The movement", M. Louis Varlez said, "has hardly yet been outlined, and already the agrarian crisis has moderated ; in some parts of the country it has already come to an end. We are taking part in a real awakening (*un vrai réveil*) of agriculture. What will it be like when the movement has developed its full proportions, when it shall have spread throughout the entire country?"

After the Act was passed in India, progress was naturally slow at first ; but success was not long in coming with a rush, entirely disproving the suggestion that Indians were devoid of the co-operative spirit. In 1911 at the end of seven years' working when His Majesty the King-Emperor uttered the words with which this chapter is opened, there were 3,456 societies with a membership of 220,958 persons, and a working capital of £686,000. Out of that sum, the Government had been called upon to provide only £46,000. The rest had been found by the people themselves. Germany, the land to which we are all prone to turn for lessons in these matters, could show no such example of rapid growth. The first twenty-five years' working of the Prussian Co-operative Law only produced 1,729 co-operative credit societies. A new Co-operative Credit Societies Bill had to be introduced in the Imperial Legislative Council of India to meet the growing demand of the extraordinary progress this movement had made.

Sir Frederick Nicholson recommended societies of the Raiffeisen type, but there are also organisations on the basis propounded by Schulze Delitzsch, while Burma appears to prefer societies based upon the model which Luzzatti made popular in Italy. Sir Theodore Morrison is of opinion that "every Province appears to be developing a special type of society adapted to its special social structure." And this is as it should be. It is difficult to nurse an exotic to maturity and often the attempt ends in dismal failure. It would be easy to show how the smaller farmer of Europe has provided himself with capital by means of association, and how the increased application of capital has been the cause of a great development of agriculture. But the peculiar conditions of the cultivator

classes in the various provinces of India make the application of European examples very remote.

When the first Registrar for Bengal was appointed there were only 58 unregistered societies in existence in the Province which then comprised not only the districts which now constitute it but also the Province of Bihar and Orissa. The Department was re-constituted in April, 1912, when, as a result of the territorial re-distribution, the present Presidency of Bengal was formed with 943 societies of all classes in it. These consisted of 7 central banks, 875 rural credit societies, 56 urban banks and 1 producers' society. They had a total membership of 88,569 and a total working capital of Rs. 26,07,573.

In 1914 the Governor General of India issued a comprehensive resolution reviewing the progress that had been made by the co-operative movement and took stock of the position attained by it. It referred to the remarkable progress made by the movement which could not have been foreseen by the most sanguine believers in co-operation. The following among other maxims were stated as representing the teachings of the experience gained :—

(1) That mortgages as a security for debt, though ordinarily discouraged, are not without their uses in certain cases,

(2) that the early clearance of a member from previous debts after his admission to a society is desirable,

(3) that it is necessary to confine the grant of loan to those required for productive purposes,

(4) that while it is desirable that Government should remove certain technical obstacles in the way of co-operation it would be unwise to grant exceptional concessions as this would remove from the societies the incentive to self-help, „

(5) that while it is impossible to lay down any general rule regarding the comparative importance of the different sources from which the funds of societies are derived, it is essential that the bulk of these funds should be in a form easily realisable,

(6) that the greatest importance should be attached to the punctual repayment of loans, and

(7) that while there may be advantages in the earlier stages in using the reserve as part of the working capital of the society, it should gradually, as it becomes more important, be set apart for separate investment.

The sixth maxim clearly shows the difference between a co-operative credit society and a land mortgage bank.

In 1917-18 the Bengal Co-operative Organisation Society was started with the object of developing general interest in co-operation. The Bengal Provincial Co-operative Bank, Ltd., (or Federation as it was originally called) was registered in 1918. This year witnessed a considerable development of agricultural non-credit and non-agricultural societies. The Naogoan Ganja Cultivators Co-operative Society Ltd., which successfully ousted the *ganja* brokers and placed the cultivation and sale of the crop on a satisfactory basis is an example of successful undertaking. This as well as the Bankura Industrial Co-operative Union are of a type of society different from the ordinary agricultural society. As a matter of fact there are two main lines on which societies can be constituted and these are known by the names of their originators, Raiffeisen and Schulze Delitzsch. The Raiffeisen Societies are mainly for agriculturists and are often spoken of as "Rural Banks" while the Schulze Delitzsch Societies are primarily for artisans and are described as "People's Banks". In India Societies have been started primarily for agricultural needs and have, for the most part, conformed to the Raiffeisen type; but European models have not been slavishly copied, such departures from the recognised type being made as were called for by the exigencies of the situation, namely, new conditions and the new soil upon which it was grafted and on which it had to be acclimatised. This is an indication and a proof of the vitality of the movement in India.

The Central Co-operative Anti-Malarial Society is peculiar to Bengal and has for its object the propagation of the forming of primary anti-malarial societies in the mofussil and rendering them assistance.

The Bengal Co-operative Organisation Society was reconstituted and registered in 1925-26 and over half the total number of Societies in the Province were affiliated to it. Its object, as has been stated before, is to develop general interest in co-operation. It has not, in any way, outlived its period of utility. The Bengal cultivator and the hereditary art handicraftsmen of Bengal have not taken proper advantage of the openings afforded by the Association. Intensive propaganda alone can remove prejudice against these societies and make people realise the benefits that will accrue to them by co-operation. Societies must teach them the virtue of co-operation. Sir Theodore Morrison who has made a study of the subject in all its bearings is again of opinion that, "In India the ground is already prepared for the foundation of small co-operative banks ; the villagers are fully conscious of his need for capital to buy bullocks or seed, and he is painfully aware of the burden imposed upon him by the village money-lender. If he can be got to realise that by association he may borrow not perhaps as much as he wants, but as much as his fellow-villagers think good for him, the foundation may be laid of a genuine co-operative movement, which will easily extend to co-operative buying and the maintenance of co-operative industries". At present the obstacles to this movement are moral and the great virtue of the co-operative movement is that it educates in thrift and self-reliance at the same time as it provides the required capital. "At the heart of every economic problem lies a moral problem ; and the surest cure of economic evils is one which gives the people the means of overcoming their troubles themselves". Co-operative banks are such a means, and there is, therefore, no nobler or more genuinely patriotic work to be done in Bengal than to teach the people to organise a village association upon the principle of mutual credit. This work the Organisation Society has taken upon itself. Its importance cannot be over-estimated. The splendid work done by the Irish Agricultural Organisation Society has evoked the wonder and admiration of the civilised world. It had to undertake uphill work among an ignorant, impecunious and suspicious

peasantry which had become degraded not only economically but morally also. Arthur Young, in his *Tour of Ireland* described the degradation of the poor people—the agricultural class thus :

“A landlord in Ireland can scarcely invent an order which a servant, labourer, or cottier dares to refuse to execute Disrespect or anything tending towards sauciness he may punish with his cane or horsewhip with the most perfect security. A poor man would have his bones broken if he offered to lift a hand in his own defence Landlords of consequence have assured me that many of their cottiers would think themselves honoured by having their wives or daughters sent for to the bed of their master”.

Such was the depth of degradation to which they had descended. But the Irish people have emerged from the dust. They stand erect. That co-operation is one of the principal factors in their change must be admitted. It is the magic touch of the co-operation's wand which has changed the nature of the country and the character of the people. And yet Sir Horace Plunkett had to carry on propaganda to convince the Irish peasant of the power of co-operation. In the first of the I. A. O. S. leaflets he explained the objects. He said that he and those who were working with him had carefully studied Ireland's depressed condition, and were persuaded that they had found a means of bringing about a better state of things in the country. “They take it for granted that the welfare of Ireland depends mainly upon the welfare of the Irish farmer. To make Ireland prosperous many things will have to be done, many industries promoted ; but the first thing to be done is to improve the farmer's condition. And this improvement, they are persuaded, can be, and is being, brought about by the farmers themselves uniting to improve the methods of their industry, as all the prosperous farmers of the world have done or are doing”.

They laid down two fundamental principles for the movement which was a national effort to hasten the necessary

economic revolution in Ireland. It was necessary to understand the two principles clearly before any progress could be made :

(1) that the salvation of the industry of agriculture must come from the agriculturists themselves, and

(2) that the cultivators could not effect the desired improvement as individuals.

The work to be done could only be accomplished by united effort, or, in other words, by agricultural co-operation.

Under modern economic conditions, combination must be resorted to for success in every industry—agriculture not excepted. Isolated action no longer pays. Those engaged in every industry which is still profitable join together to protect and advance its interests.

Sir Horace Plunkett set before the Irish agriculturists whose salvation he had made the mission of his life some of the improvements which individual farmers cannot accomplish, but which are easy of accomplishment when they join together. A well-organised Association of farmers improves the condition of the farming industry in five main directions. They were thus explained by Sir Horace :

(1) It enables them to own and use jointly expensive machinery which could not be owned generally by individuals. It gives the member the use and all the profits of the latest appliances for the manufacture of butter and other milk products. It will be able through the societies to improve the poultry and egg trade, which the efforts of individuals must fail to accomplish. It lowers the cost of production for its members in many ways. It obtains for them seeds, manures, feeding stuffs, implements and general farm requisites, of the guaranteed quality and at the lowest cost.

Needless to say that it is necessary and essential for the improvement of the industry of agriculture in Bengal to undertake the manufacture of butter and other milk products, to develop poultry farming and use better seeds, manures, feeding stuffs, implements, i.e., labour-saving machinery, etc. Thus when once the co-operative spirit has taken root, it is very probable that the Indian villager

will realise that he can develop the trade in *ghee* (clarified butter) with great advantage to himself. Pure *ghee* is difficult, if not practically impossible, to obtain in Indian towns. "In the manufacture of good *ghee* on co-operative principle there is an opening for co-operative dairying which has in Europe often proved to be the beginning of a far-reaching co-operative movement".

(2) The Association can exercise same control, in the farmers' interest, over the marketing of produce. It can get the commodities carried at a lower rate to the markets, and in much better condition. A radical reform in the carriage of agricultural produce is urgently needed : but redress cannot be obtained until the producers are organised into a powerful combination. Even then they will have to bulk their consignments as the foreign exporters do.

(3) When the market is reached, if the cultivators are associated together, they can have their goods sold by their own agents, in their own interest, and thereby they would save to themselves many of those middle profits which represent the astonishing difference between what the producer gets and the consumer pays.

(4) It has been proved that by co-operation the farmer can borrow money at a much lower rate of interest than he has to pay when borrowing individually ; and, what is also very important, he can have the loan made for a sufficiently long term to enable him to repay it out of the profits earned by the application of the loan itself to productive uses.

(5) Lastly—and this is the greatest advantage of all—when they learn how to work together to do the things sketched above, they will find that, by exchange of ideas among themselves, by friendly discussion and mutual help, they will become better farmers, better business-men and, as they will be building up the country on the surest foundations, better citizens.

Thus will truly and firmly be laid the foundation of a better Bengal—better socially, morally and economically—than the

despondent and decaying Province we witness to-day whose downward course we all deplore but cannot arrest.

The departmental activities connected with the co-operative movement are :—

- (a) Propaganda and organisation
- (b) Registration
- (c) Financing
- (d) Supervision
- (e) Audit
- (f) Enquiry and inspection
- (g) Arbitration of disputes
- (h) Liquidation

The operations of co-operative institutions in Bengal are certainly promising. The latest report available (for the year ending 30th June 1932) shows :—

(1) The total number of agricultural credit societies—including grain banks—was 20,175. The total working capital was Rs. 556 lakhs—the share capital owned by these societies was Rs. 54.28 lakhs and members' deposits Rs. 20.04 lakhs,

(2) The number of agricultural purchase and sale societies stood at 89 and their total working capital was Rs. 6,81,627,

(3) The number of irrigation and drainage societies was 933 with a membership of 24,075,

(4) There was 36 co-operative agricultural associations,

(5) The number of non-agricultural societies was 512 with a membership of 182,510 and a total working capital of 316 lakhs,

(6) There were 119 central banks and their total working capital stood at Rs. 495.75 lakhs.

Mention should be made of

(a) The Central Co-operative Anti-Malarial Society Ltd.
—the number of registered societies affiliated to it
being 782,

(b) The group of societies affiliated to the Calcutta Milk

Union of which the following figures should prove interesting :—

	1929-30	1930-31	1931-32
Number of societies ...	105	113	117
„ „ members ...	6,414	5,812	7,491
Share capital ...	16,448	17,243	17,679
Reserved fund ...	53,476	59,994	65,397
Full working capital ...	83,731	86,453	94,770

(7) The silk societies,

(8) The weavers' societies.

The operation of the co-operative system has not been free from defects and deficiencies. As the Departmental report frankly admits—the prolonged economic crisis has revealed grave defects in the system under which agriculturists were financed in the past. In the first place, money which was obtained mainly as deposits for a period extending from one to three years was invested as loan for long term purposes—an error of judgment which cannot but be deplored deeply, and which is contrary to all ordinary laws of investment. Secondly, most of these loans were advanced in years, when owing to the high prices of agricultural produce, particularly of jute, the credit of the agriculturists was high, revealing shortsightedness in the higher *i.e.*, supervising as also in the lower and local staff. Thirdly, owing to the ease with which deposits were obtained, loans were readily granted relying on the security of unlimited liability and the assets of the members without due regard to their repaying capacity—disclosing want of experience and efficiency in and casting a slur on the Department as a whole because the responsibility must be fixed on every section of those entrusted with the work. Fourthly, much attention was not paid to the fundamental principle that loans should be utilised only for the purpose for which they were granted. And lastly, there was a certain amount of leniency in the matter of recovery, such leniency being mistaken for kindness to the borrowing members.

To these must be added other and more serious mistakes

like the formation of large societies and the launching of ambitious schemes regardless of the serious responsibility which attached to them.

There have been defects, deficiencies and even abuses. But it is through mistakes that we can reach success. The theory of to-day is often the error of tomorrow. Error is nothing but a shadow cast by the strong light of truth. Theories, as they arise, are an absolute necessity for the progress of a movement, because they collect in a common focus all the light which is shed upon a subject at a particular period.

The defects and deficiencies of the co-operative movement in Bengal have become known now. And Sir John Anderson has aptly remarked that for rural reconstruction in the Province "provision would certainly be required for the development of co-operative institutions on lines designed to avoid the defects that have become apparent in the existing movement".

The example of Denmark and of Ireland before her new political development go to show that Gladstone was perfectly justified in remarking that co-operation was "the great social wonder of the present time".

Mr. Harold Faber, the authority on Danish Agricultural Co-operation has pointed out that co-operation is the watch-word and is very closely inter-woven into all the activities of farming in Denmark, and indeed, has contributed very largely to the emancipation of the peasantry. Its great advantage lies in the fact that an improvement to be real and abiding should come from the peasant farmers themselves.

But the usefulness of the co-operative movement does not exhaust itself in improving agriculture. Its effect is felt in every department of national activity, specially in a poor country where capital is difficult to secure. It can and should be made to work wonders in the domain of small industries infinitely more suited to the requirements of Bengal and essential for rural reconstruction. And it certainly leads itself to better living. In devoting our attention to agriculture, the universal industry of India, we must not lose sight of the importance of industries which must come in for their share

of attention. This is what is done in other countries. The objects of a Raiffeisen Society are thus described in Section 2 of the Model Articles :

"The object of the society is to improve the situation of its members *both materially and morally*, to take the necessary steps for the same, to obtain through the common guarantee the necessary capital for granting loans to members for the development of their business and their household, and to bring idle capital into productive use, for which a savings bank will be attached to the society."

These societies cater for the agriculturists as also for those engaged in other industries. And the result achieved by them has thus been described by H. W. Wolffe after personal investigation :

"You should go into the valley of the Rhine where Raiffeisen banks have been longest at work, and observe to what extent homes have been made habitable and comfortable ; how culture has been improved ; how machinery has been purchased, and the best manures and feeding stuffs ; . . . how the small peasant can now buy his implements and manure of the best quality at the cheapest wholesale prices, and yet thanks to a large reserve accumulated in his bank, raised up seemingly out of nothing, as if by fairy hands—at six months' credit. You should see how small industry and trade have been developed ; how the usurer, once all-powerful, has been driven out of the field, and those once poor men have become small capitalists".

The picture is attractive. And what has been achieved in other countries need not and should not be beyond the reach of the Indian peasant and the Indian handicraftsman who are ready to take full advantage of the co-operative movement. They cannot evolve the system. It is for the Government and the intelligentsia to correct mistakes in the existing systems and evolve such as are suited to the requirements of the Province or rather to the different parts of the Province.

Indeed the co-operative system is so essential to the economic stability and the social regeneration of the rural

population of Bengal that one cannot but agree with the signatories to the report of the Royal Commission on Agriculture in India that, "If co-operation fails, there will fail the best hope of rural India".

In any scheme of development and reconstruction, co-operation must play the most important part. Co-operative Societies are the "growing spot" of reforms, and economic work can be most usefully begun with co-operative societies.

In the attached map, the distribution of co-operative societies, both agricultural and non-agricultural, over the Province has been shown. The number of societies and their activities depend to a great extent on the economic condition of the district, the nature of holdings, the products, the density of population, their education and various other factors. But still it is obvious that only the fringe has been touched in this direction and there is still immense scope for expansion and improvement.

CHAPTER IX

AGRICULTURAL MARKETING

No agricultural plan can be fully effective unless adequate provisions are made for marketing the produce. Admittedly, marketing facilities for the Bengal peasants are sadly defective and almost wholly wanting. The Royal Commission on Agriculture drew pointed attention to the various handicaps under which the cultivators in India have to labour. All these handicaps are felt by the Bengal peasants in a more or less marked degree. The Bengal Banking Enquiry Committee, which investigated the question with particular reference to Bengal only, referred to some of the most serious difficulties which face the marketing of agricultural crops in the Province. One of the handicaps under which the agriculturists suffer is the long chain of middlemen between the producer and the ultimate consumer. A substantial part of the price which the consumer pays for the commodity is swallowed up by these intermediaries. There are different grades of middlemen in the case of different crops, their number depending on the nature of the crop. As the then Registrar of Co-operative Societies, Bengal, pointed out in the course of his evidence before the Royal Commission on Agriculture, the number of middlemen is found to be larger in the case of the cash crops than in the case of the ordinary food crops. Let us take for example the case of jute where the number and classes of middlemen are the largest. The number of intermediaries between the cultivator and the export market is at least 4 and even 5, viz. the *faria*, the *bepari*, the *aratdar* or the *mahajan* and the *baler*. There is also a subsidiary class of *beparis* generally known as *paikars* in North and East Bengal. In the Punjab the grower of raw cotton puts the raw material on the cart, takes it to the market or *mandi* and sells straight to the manufacturer. There is practically no such system in Bengal in the case of jute. Here the grower

is surrounded by pests of middlemen who make a fortune at his expense. Here he has to sell his produce through brokers ; he cannot sell it direct. The cultivator sells either to the *faria* who comes to his house or to the small *beparis* at the *hats* or markets. These local *hats* are held all over the district, usually twice a week. The cultivators bring their produce to these *hats* for sale to the *beparis* who are the first intermediaries. The *bepari* is usually considered a more important person than the *faria*. The *bepari* is a local dealer who is sometimes, but by no means always, a money-lender. He buys direct from the cultivators at the markets. He sometimes visits the cultivators at their own houses and saves them the time and trouble of bringing the produce to the market. Mr. Burrows pointed out in the course of his evidence that the *bepari* enjoys more liberty of action than the *faria* and can certainly use his own discretion where the capital is entirely his own, whereas the *faria* is restricted in the matter of rates by the *bepari* or the merchant for whom he works. The second intermediary is the European, Marwari or other Indian merchant or *aratdar*. The *aratdar* is not usually the owner of the jute which passes through him but charges a certain commission from the *beparis* who make use of his *arat* or warehouse for depositing their jute before selling it to the baler's agent. The baler's agent is the paid servant of the baler and does not become the owner of the jute that he buys ; but as his salary is not fixed on the principle that it is the whole of his remuneration, he is in a sense another intermediary between the cultivator and the baler.

It is the same story with paddy. *Beparis* or *paikars* move about in the villages at harvest time and collect the paddy from the homes of individual farmers as well as from the *hats*. The crop is purchased by the *beparis* sometimes on their own account and sometimes as commission agents of merchants who finance them and is taken either to Calcutta or to some other important selling centre. But it cannot be sold direct to the mills by the *beparis* who have to proceed through an *aratdar*. The *aratdars* sell the paddy to the shipper for export or to the mills for conversion into rice. The *beparis* are absolutely at the mercy

of the *aratdars* in the matter of disposal of the produce. Besides the usual charges, a commission for the sale of paddy is levied by the *aratdars*. The system is slightly different in the Backargunge District. Here a very small portion of the paddy is taken away in boats and sent to some of the other districts of East Bengal, the major portion being exported after being husked. As regards the portion which is exported, it is purchased by small *beparis* who go from door to door in boats or to the *hats*. It is then carried to the big centres of rice trade such as Champita, Noamati, Jhalakati, etc. The huskers at these places purchase the paddy in one *hat* and sell the husked paddy or rice at the next. Traders purchase it and either stock it or send it to Calcutta according to demand. In many places paddy is not stored at the *arat* but is sold to local *dalals* who are generally paid Rs. 3 as *dalali* or commission per 100 maunds sold.

The trade in tobacco presents the same spectacle. Every tobacco growing village abounds with *paikars* and *dalals*. *Dalals* have big godowns of their own. Agents or merchants from Akyah, Rangoon and Chittagong as well as Marwaris come in large numbers to the tobacco growing areas and purchase tobacco through the *dalals* in whose houses they generally put up. These *dalals* procure stocks through the *paikars* and sometimes direct from the growers. The most important centres for local distribution are Manikgunge and Hajigunge.

As regards the margin upon which the various intermediaries work, it will be difficult to give accurate information, for they are naturally reluctant to disclose business secrets. Mr. Burrows is of the opinion that the commission rates vary from 6 to 12 per cent. but the profits of those working with their own capital are much higher. In 1926 Rai Bahadur J. M. Mitra, Registrar, Co-operative Societies, estimated that the difference between the amount which the jute grower actually gets and that paid by the jute mill or exporter is about Rs. 2-8 per maund, the grower losing in the lowest grade 33 per cent. and in the higher grades 25 per cent. of the usual price. In Bengal, points out the Registrar, local consumption of jute is 60 lakhs

of bales and trade demand for exports is 40 lakhs. "Valued at Rs. 70 per bale, if one third of it is lost to the producer the loss is so serious in the case of one crop even, that the problem requires very close investigation".

These middlemen not only take a heavy toll but are guilty of the most iniquitous practices. Scales and weights are often manipulated against the ignorant producers. For example, the baler in the case of jute makes a good profit in the manipulation of scales by the *koyal* or weighman which means a good sum extracted from the original producers. In many cases the *dalals* again will not deal directly with the seller but only through an *adatya*, who is the seller's broker, and bargains are frequently struck by manipulation under a cloth. Various arbitrary deductions are also made at the time of weighing. In calculating the weight of jute sold, a dryage allowance, known as *dhalta* is deducted. Many other charges are also levied by the baler's agents such as *muth kabari* (staff allowance), *britti* and *newaj*. A bewildering diversity of weights and measurements is used by the middlemen to reap a good profit at the expense of the poor and ignorant growers. For instance in Jalpaiguri the local weight is 93 tolas but the weight of Haji-gunje is only 80. Again the local weight at Chandpur is 83 tolas and it has been calculated that on 100 maunds of jute 80 *sicca* weight, the baler would get 20 seers of jute extra.

Apart from the number and variety of middlemen, the most formidable difficulty which the cultivator experiences relates to financing, which is common to the marketing of all kinds of commodities. The Co-operative Societies at present are helping to a very small extent only those who are members of these societies ; but by far the most numerous portion of the cultivators must depend for financial help on the money-lenders. The extent of the profit which they might make from the sale of their crops depends on the conditions upon which the loans are obtainable. In the case of a great many crops the system of *dadan* or advance still prevails. The cultivators obtain *dadans* from the middlemen and have to sell their produce to them at unfavourable rates. In the case of paddy, it is often

found that the dealers advance money on condition that the principal and interest would be repaid in kind. The interest charged on such occasions is very high and the value of paddy has no relation to the market price under such circumstances. In case of tobacco, *paikars* sometimes advance money even at seedling time and enter into contracts with growers for the purchase of their crop at very low rates. Turmeric is another crop which is generally financed on the *dadan* system. The local *mahajans* make their purchases of raw turmeric from the peasants to whom *dadans* are made beforehand. At the time of making advances the price is fixed by the *mahajans* who then sell the dried turmeric direct to Calcutta merchants. It is the same story with cardamom which is largely grown in Darjeeling. The Marwaris give advances on an extensive scale and arrange that the crop should be sold to them. At one time when the price of cardamom ranged between Rs. 60 to 95 per maund, only Rs. 30 went into the pockets of the cultivators, and in many instances not more than Rs. 12 per maund was obtained. The potato crop in Darjeeling is also similarly financed on the *dadan* system. The *dadan* system, as it prevails in the case of jute in the Rangpur district, was thus described by the Registrar of Co-operative Societies, Bengal in his memorandum on the Marketing of Agricultural produce to the Bengal Banking Enquiry Committee :

“Money is advanced to the grower as loan on a simple bond. Though there is no stipulation under the contract to sell the jute to the person making the advance there is a very definite understanding that the borrower will sell the fibre to the creditor. Money is also advanced on a written contract on condition that the crop, after harvesting, would be sold to the lender at a specified rate. There are still other cases where advances are made on a written contract on condition that jute, after harvest, would be sold to the creditor at the prevailing market rate”.

The interest which the borrowers have to pay on these advances varies from 24 to 25 per cent. and the rate at which the

producer contracts himself to sell is frequently lower by 10 to 25 per cent. of the anticipated market rate. Thus, as the Bengal Banking Enquiry Committee rightly observed, the cultivator incurs a two-fold loss—he pays a high rate of interest and is forced to sell below the ruling market price. The creditors are very insistent in their demand and the farmers, unable to hold on their crops, are obliged to dump their produce on the market at any price available.

The next factor that engages our attention is the absence of an organised market for any agricultural produce except tea. But tea can hardly be regarded as a purely agricultural product. The situation in Bengal is not different in this respect from that in the other provinces. Unregulated markets are prevalent at various centres. The only exception seems to be the case of the Berar Cotton market. The constitution of the organised cotton markets in Berar is regulated by special legislation—the Berar Cotton and Grain Markets law of 1897—and their management is in the hands of elected committees. According to the evidence of the Indian Central Cotton Committee before the Royal Commission on Agriculture, details of the methods of disposal of the *kapas* or cotton by 640 cultivators went to show that 46.1 per cent. of their crop was sold in the open regulated markets while 36.5 per cent. was sold in the villages, mainly to travelling buyers. In more recent years attempts have been made to introduce, by legislation, regulated markets in Bombay and Madras. It is desirable that steps should immediately be taken to establish by legislation regulated markets in Bengal.

The problem of the improvement of marketing facilities requires the improvement of marketing services and secondly marketing agencies. The marketing services, according to Horner, Royle, Steen, etc., who are authorities on agricultural marketing, include

- (1) grading,
- (2) packing,
- (3) storage,
- (4) transportation,

- (5) financing,
- (6) risk taking.

Let us now consider each of these items and find out what the situation in Bengal is as compared with America and other countries where agricultural marketing is highly developed.

First, as regards grading and packing, grading has been defined to be "the process of sorting produce into lots of uniform quality." The question of grading is particularly important in the case of agricultural products. In the case of machine made goods, man can control the action of machines and, therefore, can ensure uniformity. The same machine may be made to turn out goods of identical quality, nay, a hundred different machines may be made to produce the same type of goods from day to day and from year to year. But it is obvious that the fruits from one tree will be of many sizes, shapes and qualities; the product from several plants will not have uniformity. Nature does not grow products of a uniform shape, size and quality. But the consumer desires uniformity. Hence man must make the product uniform before it is taken to the market.

The appearance of the product has a great deal to do with its successful selling. The consumer, retailer or wholesaler, is pleased when it is carefully exhibited in attractive packages and is properly graded. On the other hand, it will surely repel him if it is put in dirty packages, is decayed and not graded in size or quality. It is frequently asserted, and quite correctly also, that a well grown product properly graded, packed and shipped is more than half sold.

(a) It gives uniformity to the product.

(b) It decreases waste in marketing. The waste in the case of perishables is the greatest. Oranges, mangoes, pineapples, bananas, etc. are highly perishable products and an enormous quantity is wasted during the marketing process. Take again the case of potatoes. Here is a wide gulf of difference between the price at which the retailers sell and that which the farmer gets. If the potatoes were so graded that they could come to the retailer in a condition suitable to be delivered to the con-

sumer, the farmer could sell on a smaller margin. For it would then not be necessary for him to stand the losses which he would have to incur on account of the potatoes of poorer quality and condition.

(c) It increases the market value of the product. This point is specially important from the grower's point of view. Good fruits like oranges or mangoes which have been uniformly well graded and sized and are in sound condition soon acquire a reputation in the market and command a good price. Consumers are attracted by good appearance and pay higher prices. This is true not only of perishables but even of non-food products like cotton, jute, etc. If the mill owner is obliged to buy jute or cotton unassorted, he may find that 25 per cent. is not quite suitable for his purposes and this *unwanted* amount has to be stored and disposed of somehow in some way. Under the circumstances, it is evident that he will only pay a price which will not only cover probable losses but also the carrying charges.

(d) It follows, therefore, that grading reduces risk. The purchaser of a well graded box of oranges knows exactly how many oranges he can get out of the box.

(e) It makes sale by sample possible. Under modern conditions of marketing, the buyer or the seller does not see the goods in many instances. It is not possible for the buyer to inspect physically every bit of produce before closing a deal.

The existence of standard grades removes all these difficulties.

(f) It makes storage on a large scale possible. The storing of grain (wheat) in the elevators in America, Canada and Australia would not have been possible if the wheat were not classified into different grades according to quality. The farmer who puts his wheat in a grain elevator need not worry whether he gets the identical wheat he had put into it or not. It is entirely a matter of indifference to him so long as he gets back wheat of the same quality or value. The working of the elevator system would not have been practicable if grading was not practised.

(g) Lastly, it places financing on a better basis and makes possible the increase of warehouse receipts. The absence of universal grades for Indian produces, as they exist in America, is a source of endless difficulties and often gives rise to the trouble of arbitration and claims. Take for instance, cotton. There are certain specified grades about the American cotton, beginning at about "mid fair" coming down to "fully good middling", "strict middling", "middling", "low middling" and so on. A spinner of American cotton in England has no difficulty in buying the exact type of cotton he requires. But in India we have not got a system similar to that in America, although certain grades have obtained reputation such as Broach, Cambodia, Dharwar, etc. A great drawback from which the Indian cotton suffers is that spinners in England are unable to rely upon getting consistent shipments as regards quality even during the same season. The Oldham Master Cotton Spinners' Association observed, in the course of their evidence to the Royal Commission on Agriculture, that the establishment of reliable standard types with confidence that shipments might be depended upon would be an important factor in attracting spinners of American cotton. The advantages of standardization of varieties are specially great in the case of cotton, jute, corn, wheat and other farm produce. Standards are admittedly difficult to establish in the case of fruits and vegetables owing to their perishable nature and wide difference in varieties. But if they are established, production will be uniform and *loading* and sale will become easier. The establishment of suitable standards should include regulations as to digging, handling, sorting, sizing and packing. In many instances in America the farmers have been able to achieve standardized production in the case of fruits and vegetables, e.g. the Michigan Potato Grower's Exchange has standardized on the production of the Russet Rural Variety. Nearly 90 per cent. of the potatoes sold through this exchange is of this variety.

Next as regards packing, it will be no exaggeration to say that there is no civilised country in the world other than India which tolerates such a deplorable handling of fruits and other

food products as obtains here. Cotton, jute, rice, wheat and all other agricultural products require good packing but the problem is most acute in the case of fruits, vegetables and dairy products. Improper packing and weak packages render them extremely liable to damage during transport. Exposure to unfavourable temperatures is highly injurious to them. Boxes, crates and baskets are permitted to fall and become broken in the course of loading into and unloading from wagons, trucks and carts. Bags may be torn when handled with hooks. Things like butter may absorb an offensive smell and acquire an unpalatable taste when packed or stored along with other goods. Decay and deterioration are bound to result owing to *brown rot* splitting due to rainy weather at harvesting time and fungi gaining entrance through bruises during transport or scratches by finger nails in handling. This loss is quite enormous even in case of America where packing has almost been perfected. It was revealed during an inspection in 1920-21 by Federal Authorities in New York City of 3,676 cases of fruits and vegetables that the cause of deterioration was the lack of proper care in packing.

The following graphic description given by the Mango Marketing Committee in their report regarding the organisation of marketing mangoes in the Konkan is generally true of all parts of India and is certainly applicable to Bengal :

“No particular care is taken in storing fruit for packing them. Good and bad fruit is packed in the same basket. Bad, unshapely fruit is kept at bottom or middle of the basket while the best fruit is packed on the top and this is how the fruit of low quality is supposed to be hidden. 20 per cent. is picked unripe. Package used is a delicate bamboo basket which can hold 75 to 100 mangoes. The top is sown with gunny strings which can be opened and refixed undetected. At the time of unloading the carts, the packages are actually thrown from the cart to the ground and stored one over the other indiscriminately at the *bunder* in the open. The *bunder* labour either rolls those packages over the wharf steps and allows them to fall or throws them into small boats in order to take

them to the steamers. When it arrives, the baskets are picked from the boats or thrown on board the steamer or into the hold through the port-holes as may be possible. The temperature in the holds is very high. The time allowed for hauling these baskets is very limited. 400 baskets are thrown into the hold within 15 minutes, though only one basket at a time can be thrown through the port-hole."

The basket system of packing is entirely unsuited to rough handling in transit. The damage is enormous and a large percentage of the fruits shows at places where damage was done during transit. There is also much loss due to fungi and insects. Large quantities of oranges, mangoes and bananas have often to be thrown away. The absence of suitable packing render their consumption often dangerous from the sanitary point of view. The rotten fruits are frequently purchased by the poorer classes at low prices, a practice which is followed by disastrous consequence. If careful investigations were made, it will certainly be found that the high incidence of food-borne diseases in Calcutta alone is to a great extent due to the consumption of fruits of this kind. The situation in this country presents a remarkable contrast to the handling and marketing of fruits in America and other Western countries. The spectacle of well graded apples and oranges packed in delightful cartons is very pleasing and induces the consumer to pay high prices for them.

In London Colonial butter and cheese are discharged as follows :—

(a) By specially-constructed iron box trays, which are lifted from the hold of the vessel by hydraulic cranes, and placed overside into craft or on to the quay and trucked to the shed.

(b) By elevators, which lift from the hold and place on land conveyers, working on the endless chain principle, for conveyance to the shed.

Huge refrigerators at the Royal Victoria and Albert Docks and at the West India and Surrey Commercial Docks—the latter with its rooms of varying temperatures specially erected

for the reception of dairy produce—provide ample accommodation for cold or cool storage at reasonable charges. Storage is also provided at the Royal Victoria Docks in vaults, which have been specially provided for dealing with dairy produce. The wholesale provision merchants avail themselves largely of this very convenient accommodation.

Cannot the Municipal markets in Calcutta set an example in this matter?

At the Royal Victoria and Albert Docks in London the discharge of apples is effected principally by hydraulic cranes, which bring the cases of apples from the hold of the ship, deposit them on the quay to be run to their piles in the shed and delivered to vans or railway wagons. The authorities provide large, airy and well lighted sheds for the performance of this work.

The advantages of packing consist chiefly in maintaining the grade, making handling easier, reducing waste and transportation costs, keeping goods sanitary, and making brands possible. The branding of apples and oranges (sunkist) would not have been possible without packing. It is clear from what has been stated above that packing plays an important part in the marketing of agricultural produce. It has been developed almost to an art in the United States of America but it is a matter of regret that no attention has yet been paid to the problem in Bengal. It may be pointed out that the damage due to bad packing and handling runs into several millions of dollars even in America where the system of packing is so highly developed. For example, the annual loss in the States of Kansas, Oklahoma, Nebraska, and Texas on account of various forms of damage to wheat owing to handling amounts to \$5,000,000. Several American Railway Companies have to pay in large amounts of money on claims due to loss of food products during transportation. For example, during 1920 the American Railway Express Company paid out loss and damage claims to the extent of \$5,635,000 nearly. The affairs took so serious a turn that the Express Company had to inaugurate an active campaign known as the "Right Way" plan, with a

view to impress upon the public and its own employees the magnitude of the loss and also to suggest remedies. By means of pamphlets, circulars and placards, the right and wrong way of doing things was illustrated. Demonstrations were also actually given to show the proper way of packing and loading goods. It is interesting to note that as a result of the campaign, the 1921 payments were reduced to \$2,250,000, that is to say, a reduction of nearly 50 per cent.

We wonder if anybody has ever taken the trouble of computing the loss that occurs in Bengal owing to the deplorable manner in which perishables and non-perishables, food and non-food products are packed. If a careful investigation were made, the annual loss would undoubtedly run into a sum of at least six figures. A thorough and systematic campaign to reduce this enormous waste due to bad handling and packing must be one of the corner stones on which an efficient marketing system can be built up.

After grading and packing, proper attention must be paid to the problem of storage of farm products. The importance of storage is as little understood here as those of packing and grading. Storage, it should be remembered, is absolutely necessary, for, marketing takes time and production is seasonal while consumption is continuous. As Boyle has put it, "storage overcomes maladjustment between time of production and time of consumption." Most of the agricultural products—corn, cotton, eggs, butter, potatoes, tobacco—are produced in one part of the year but are consumed during the 12 months of the year. There are three principal types of technical storage requirements, *e.g.*, common, special and cold according as they are needed for storing one or other kind of product. Common storage consists of ordinary storehouses which are constructed in such a manner as to keep the products from being wasted and getting damp. The granary is an example of common storage. It need be built only in such a way as to hold the grain, keep it dry and prevent vermin from entering into it. Cold storage is required for perishables such as fruits, fish, milk and other dairy products. There is a

third kind of storage, *viz.*, the special storage. It is not generally known that potatoes, onions, sweet potatoes require a particular temperature so that they may remain quite fresh. They cannot be kept at either cold or common storage. They require to be stored in places where the temperature can be maintained at a uniform rate. Such places are equipped with air circulating devices.

There is a positive lack of storage facilities for the farm products not only in Bengal but throughout the whole of India. Cotton is stored in the open, and there is considerable weather damage. Paddy is stocked in such a manner that rats and vermin destroy a good portion of it. The importance of putting jute in a fire-proof storage is *seldom* recognised. Fruits and vegetables are stored in such a manner during transport that a large portion of them get rotten. A very crude form of cold storage is used for fish by putting it in between slabs of ice but it hardly remains fresh when it travels a long distance to the city markets. Even such a big city as Calcutta has no public cold storage excepting one recently established at Watgunj for the use of dealers in perishable goods. There is a huge waste of fish, milk, fruits and dairy products owing to the absence of cold storage facilities. The E. I. Railway runs a cold storage refrigerated parcels service but it hardly touches even the fringe of the problem.

It will be interesting to take a brief stock of the situation in this respect in the United States where agricultural marketing facilities have been developed more than anywhere else. First, as regards cold storage, there are cold storage warehouses of 2 kinds, *viz.*, public and private. In the private cold storage establishments, the owner of the warehouse stores his own goods; whereas in the public establishments, food products can be stored on hire and the owner of the warehouse is not interested financially in the commodities stored there. There is an intermediate type which may be called a combined public and private establishment. Even in 1922, the

number of cold storage warehouses was 1,315 in the United States, distributed as follows :

(a) Public	...	...	..	353
(b) Private	...	...	...	261
(c) Combined Public and Private	...			222
(d) Meat Packing establishments	...			455
(e) Meat Packing establishments doing a public cold storage business	...			24

In all these, the total refrigerated space amounted to 559, 138,225 cub. ft. .

The average of commercial apple crop in cold storage during 1915—1921 was 21.8 per cent. of the total. In 1922 the figures for creamy butter in cold storage were as follows :

In thousands of pounds

Jan. 1	Feb. 1	March 1	April 1	May 1	June 1
48,412	35,047	22,582	9,113	3,830	13,202
July 1	Aug. 1	Sept. 1	Oct. 1	Nov. 1	Dec. 1
67,410	1,03,151	1,12,039	96,680	7,385	47,773

The United States grain crop is about 5,000,000,000 bushels annually. According to Boyle, whom we have already cited, storage facilities for this were

	Million bushels
Country elevators	... 550
Mill elevators	... 150
Terminal elevators	... 250
Farm storage, granaries, etc.	... 3,000

3,950

These facilities must have increased enormously by now.

The system of storing grain in co-operative elevators is also in vogue in Canada, but we shall come to that later on.

In marked contrast with the elevator systems prevailing in these countries, we find in India an utter lack of such facilities. The question of the erection of grain elevators has been before the public for several decades. As early as 1889

Mr. James Smith of the firm of Messrs. Ritchie Stewart Co. of Bombay wrote to the Under-Secretary of State for India informing him that he wanted to introduce in India the system adopted in U. S. and Canada for cleaning, grading and storing wheat and form a "Grain Cleaning and Elevator Co." for the purpose in India. The probable cost of the Company was estimated to be £25,000. Government assistance was sought in the following respects :

- (1) Free provision of land for the Company's purposes.
- (2) A guarantee that similar facilities will not be afforded to a competing company or individual for a term of 25 years.
- (3) A guarantee of interest at the rate of 4 per cent. per annum for the first five years of the Company's operations, such advances being repayable without interest from half of surplus profits in excess of 6 per cent. The Royal Commission on Agriculture have stressed in recent years the importance of introducing the elevator system in India but no steps have yet been taken in this direction.

From the preceding discussion it is clear that Bengal is sorely suffering from lack of storage facilities. The importance of the problem of providing various forms of storage will be understood when it is remembered that storage or warehousing fulfils certain valuable functions. Firstly, it will protect the product, preserve its quality and hold it until the time when it is required for consumption. It has now been perfectly recognised that under modern conditions of storage, food cannot deteriorate and injure health. If an egg comes out of cold storage rotten, it is because it went there so. Similarly it has been proved by competent medical authorities in America that milk from thousands of different cows "pooled" together in the refrigerating chambers is not at all deficient in nutritive values. Secondly, it may be pointed out that not only does the quality remain unimpaired but it actually improves with storage in the case of certain products. Tobacco, for example, improves with age. Sweet potatoes should be taken through a special storage process of drying and ventilating before they can be safely sent to the market. Thirdly, it equalizes prices throughout

the year. It is not true that storage lends itself to speculation. Boyle has pointed out that under the present cold storage system in America, there are fewer cases of cornering the market than there were in the past. Without storage farmers would undoubtedly have been forced to sell at ruinously low prices at certain periods. Lastly, it should be noted that the system of storage and warehousing facilitates financing to a great extent. Warehouse receipts have become generally acceptable to bankers as security for loans on agricultural products in the United States. There is probably no better or cheaper form of credit in agriculture, commerce or industry than that based upon warehouse receipts. The farmer, who stores his goods in a warehouse, gets a receipt, containing a description of the stored goods, their grade and their weight. The receipt may then be taken to a bank and used as collateral for a loan. In 1916 the United States Warehouse Act was passed which provided for the licensing and bonding of public warehouses, storing agricultural products, so that the integrity of their warehouse receipts might be unquestionable. In the beginning warehouses were licensed for storing cotton, grain, tobacco and wool. An amendment of the law was made in 1923 which enabled the Secretary of Agriculture to license warehouses for storing any agricultural product that he might think proper. By 1925 warehouses were licensed to store not only cotton, grain, wool and tobacco but also potatoes, dry fruits, etc. The total capacity of warehouses licensed under the United States Warehouse Act of November 15, 1924 amounted to

Cotton bales (1922) ...	...	2,661,695
Tobacco in lbs. ...	...	535,435,000
Wool (bags) ...	...	100,730
Grain in bushels ...	...	28,125,707

The Intermediate Credit Act of 1923 gave a further impetus to the licensing of additional warehouses under it. The Federal Reserve Banks readily lend on the security of warehouse receipts to their member banks. The law enacting the

Federal Banking System has specified warehouse receipts as proper collateral for banker's acceptance. These warehouse receipts have been made standard and uniform. They are known and also respected by bankers elsewhere. The village organisations we have suggested under the sections dealing with rural indebtedness and agricultural finance can establish warehouses as part of their business. Generally, the individual raiyot will deposit small quantities of produce and hence may find difficulties in utilising the receipts as collateral for a loan from an outside big bank. The co-operative societies or the village organisations can readily advance money on these securities.

Elevators and warehouses are urgently necessary for the Province. The passing of legislation on the lines of the United States Warehouse Act, as described above, should immediately be undertaken. The Government of Bengal should not only take steps to start public storage but should also give permission for storage to be started by private enterprise. The co-operative marketing societies, of which we shall speak later, should also be equipped with warehouses. Private storage should be subject to government regulation as in America. The owner must take out a license to perform this public service and report at regular intervals to the Government and must not be permitted to store goods in cold storage for any length of time exceeding 12 months. The warehouse receipts may immediately be discounted by the farmer with a bank. The establishment of institutions furnishing intermediate credit to the farmers, as they do in the United States, will be of immense benefit to the Bengal producers in discounting these forms of agricultural paper. These papers should be made rediscountable by the future Reserve Bank of India.

Transport

Transportation is an integral part of marketing. One of the most important pre-requisites of an efficient marketing system is the existence of good transport facilities. Transport must be not only quick, safe and cheap but it must also be adequate and also preserve food products from decay and

deterioration during transit. It is well known that as regards railway transport, the shortage of wagons for the movement of crops causes great difficulties. There must be proper facilities to keep the produce in a fresh condition and at a certain temperature during transit. Refrigerators, heated and ventilated cars are essential parts of the modern transportation system and have been widely adopted in America for the carriage of milk, eggs, fruits and other perishables over long distances.

Let us turn to Bengal and study for a moment its peculiar transport problem. The communication from farm to village, and from village to market is not only poor but in many instances simply non-existent. Under the circumstances the farmer incurs heavy costs, and the depreciation charges of his carts and bullocks are enhanced. There is not only this high cost of the animal haul from farm to railroad but also the high cost of rail haul and the high cost of cartage at city terminals. Rao Bahadur P. C. Patil pointed out in the course of his evidence before the Royal Commission on Agriculture that railway transport costs about 50 per cent more for wheat in India than in America. For example, cost in rupees to move 1 ton of wheat for 200 miles over different railways is as follows:—

Madras & S. M. Railway	...	10.32/-
Great Indian Peninsular Railway	...	11.06/-
United States	...	7.65/-

The cartage at the terminal, though a short haul, is frequently more costly than the much longer railway haul. There is increasing congestion and the labour cost is growing higher and higher. The cartage of perishable goods is still more costly due to deterioration which is caused by rough handling, heat and cold.

But the most serious loss to the farmers is caused by wagon shortage. The problem is fairly acute in every country but here it is a standing complaint that an adequate number of wagons is not available in the harvest season. The situation in this respect was the worst during the War time, but it still remains acute. In 1924-25 the sugarcane growers and merchants.

of Poona found the greatest difficulties in moving *gur* out of Poona and the result was a disastrous fall in prices. The speed of freight trains is also generally a matter of complaint. The average freight train speed in this country is practically the same speed as that of a man walking or of a horse-drawn wagon on the country road. The main reason of this slow movement is loss of time in junction points and at city terminals. The result is incalculable damage to perishable goods and often loss of market of all commodities. In some cases, at least, better manipulation of wagons would be of great advantage.

The problem of transport in Bengal is not merely limited to road or rail transport but also to water transport. The greater part of East Bengal, including the interior of the districts, is inaccessible either by rail or by motor truck and can be reached only by waterways and that also during the rainy season. During the other months of the year, the rivers and canals dry up and render boat or launch traffic quite impossible. Besides, the increasing growth of water hyacinth and the rapid silting up of the old canals and rivers are aggravating the difficulties of transport.

The discussion of market facilities can hardly be complete without a reference to the growing use of motor trucks. The motor truck is an important factor to-day in farm marketing. In the United States it is playing a prominent part in fruit, milk and livestock marketing as well as in the marketing of several other commodities. In many cases transportation is being done exclusively by motor truck. The motor truck has grown to be a serious competitor of the railway specially with respect to short haul business. According to the United States Year Book of the Department of Agriculture for 1922, the rate for shipment of milk for a 30 mile haul by truck round Kansas city and Minneapolis was less than half the cost of rail "shipment" plus the cost of bringing the milk to the railway station and hauling it from the terminal station to the milk distributor. As a result, several railroads in America have been using motor truck for short hauls of less than car load shipment. The same problems have manifested themselves in Bengal. An increasing

amount of farm produce is being carried by motor trucks, specially in case of short hauls and to that extent the railways have been deprived of their freight. Motor transport is definitely economical for short hauls and is quicker than railways. Proper attention should certainly be directed towards its development in Bengal. The use of motor trucks pre-supposes an improved high way. The roads in Bengal are the worst specimens to be seen anywhere in India. In the past, conditions were worse. There were very few roads except the Grand Trunk Road and a few feeder roads. In spite of rivers and other waterways used by country-boats, the want of roads was frequently responsible for the severest slumps in agricultural prices. In a year of bumper harvest the cultivator could sell his surplus produce only in the over-stocked market of his village. This restriction of his market deprived the cultivator of a great deal of the benefit of a good harvest. No wonder, severe agricultural depression often followed upon a succession of bumper crops. With the construction of roads the villager has no doubt been able to carry the grain in his cart to the neighbouring town or central mart and get a better price for his produce. But the existing roads in the Bengal villages are quite unfit for heavy vehicular traffic. During the rainy season their condition becomes not only pitiable but hopeless. Therefore, the first requisite in the development of the modern system of transport by motor trucks lies in the construction of metalled roads suitable for such traffic. The mileage of metalled road in Bengal amounts only to 3,489 and compares very unfavourably with European and American countries. A systematic road development programme under a special officer should be immediately undertaken.

Just as we are writing these lines, the announcement of the Bengal Government that a five-year plan for road development is being undertaken comes as a happy augury. The total cost of the schemes outlined in the programme, work on which has already begun, will cost Rs. 66,91,085, but the ultimate cost is put down at Rs. 99,84,608, the new road construction being 326 miles. A Special Road Development Officer has already

been appointed. It has been decided to capitalize a portion of the subsidies which the Bengal Government are receiving from the Central Road Fund and also a portion of the proceeds of the Motor Vehicles Tax Fund. A Government note on the subject remarks that an intensive effort to push on road development will be made and it is hoped that before long the amenities of transport and communication in the Province will be considerably increased.

The whole system of marketing farm produce in Bengal requires thorough overhauling. We have already discussed the various reforms that should be immediately introduced in the marketing process itself, viz. reforms in inspection and grading, in packing, in transportation, in storage, and in financing. The marketing process can be compared to a chain of several links ; any one weak link will impair the strength of the whole chain. Each link should be carefully examined with the object of effecting an improvement. But a comprehensive plan of developing marketing facilities should include not simply the improvement of the marketing process but also the improvement of the marketing agencies. Here the most important suggestion that can be offered is the establishment of co-operative marketing or sale societies. "The strategic weakness of the farmer lies in his lack of market news, in his position as a bargainer and in his treatment at the hands of buyers in the primary, terminal, and distribution markets". The experience of other countries has amply demonstrated that the co-operative marketing societies are the best agencies to remove all these weaknesses of the farmers.

The greatest development of co-operative marketing has taken place in the United States and in Denmark. In America there are such societies for every kind of farm produce, e.g. wheat, rice, cotton, tobacco, milk, eggs, fruits, livestock, etc. Messrs. Mears and Tobriner have observed in their recent work *Principles and Practices of Co-operative Marketing* that one-fifth of the entire farm product is handled through co-operative marketing associations. The annual business of grain co-operatives amounts to 600 million dollars, that of dairy products 400

million dollars, and that of livestock and horticultural 250 million. There are ten thousand associations consisting of 2 million farmers, and they are doing an annual business of \$2,000,000,000. These societies have solved many of the difficulties of the farmers in America which consisted in grading, packing, storing and financing the produce. Remarkable achievements have been wrought by co-operative marketing association through improved grading and packing of products. These associations can enforce rules more efficiently and more conscientiously than independent middlemen. The farmer is, as a rule, less reluctant to carry out the rules of an association for grading and packing than those exacted by an outside party or even by the Government. He is more careful in his production and standardization when he feels that all the benefits therefrom will redound solely to him. In the case of the various fruitgrowers' associations in California and elsewhere societies even regularly instruct the farmers as regards the proper ways of spraying and fumigating the fruit trees. In many instances these associations or fruitgrowers' exchanges, as they are called, have prevented enormous losses by converting fruits unsaleable as fresh fruits, into syrup or various other by-products. The poor grade almonds are shelled and canned into salted almonds by the California Almond Growers' Association. The Central California Berry Grower's Association barrels its soda fountain preserve from the berries which are not sold as fresh fruit. 87 thousand tons of fruits mildewed and otherwise unfit for human consumption were converted in 1923 by the Sunmain Raisin Growers' Association into syrup and other by-products.

Denmark is well reputed for her co-operative dairies and bacon factories. Co-operative marketing has also developed in various parts of the British Empire, Canada being the most notable example. Here a policy of State management of co-operative marketing has been pursued. Although State management does not sound very alluring at first blush, we have the assurance of the Hon. C. A. Dunning, the Canadian Delegate to the Conference on Agricultural Co-operation in the British Empire held in 1924, that the manner in which it has been

conducted up to the present time has been markedly successful in placing upon their feet co-operative organisations for the marketing of specific farm products. The most important of the Canadian co-operative marketing associations is the organisation for marketing wheat and coarse grains. The Canadian wheat pool is a non-profit co-operative association with a membership of 138,000 farmers in the provinces of Manitoba, Saskatchewan and Alberta. There are three provincial pools, each on a separate entity and each collecting its own grains. The Central Selling Agency handles the grain collected by the three pools. In 1925-26 the Central Selling Agency handled the enormous total of 21,50,16,000 bushels of grains. More than 56 per cent of the entire wheat crop of Western Canada was handled by the then provincial wheat pools. The Canadian wheat Pool had originally no *elevators* but all the three provincial pools are owners of large numbers of elevators to-day. In 1926 the Saskatchewan pool alone owned 587 elevators, the Manitoba pool had 30 which were to be doubled by the end of the year and the Alberta had 42 and were building another 100. Another successful co-operative marketing organisation is the Canadian Wool-Growers Co-operative Association.

Co-operative marketing of Agricultural Produce in England.

Co-operative marketing of farm produce has made rapid strides in England in recent years. It appears to be a purely post-war development. It was only in 1917 that co-operative marketing began to make some advance in England but it was then in a rudimentary state. From 1917 onwards till the cessation of the War, however, the number of co-operative organisations showed signs of a steady increase ; but co-operative marketing still remained a relatively insignificant development. The year 1920, in which agricultural co-operation reached its peak as regards turnover in the country, witnessed a remarkable growth of the co-operative sale movement. Of the trade to the value of £17½ millions credited to farmers' co-operative organisations in that year, £6¾ millions represented the proceeds of the co-operative sale of produce. Since 1920 there has been

a significant development of the co-operative marketing movement in every branch of agricultural production. The number of egg and poultry societies, fruit and vegetable societies, milk and dairy produce societies, co-operative bacon factories and slaughter houses has shown an appreciable increase ; while co-operative live stock trading, co-operative wool marketing and co-operative marketing of grain, fodder and potatoes have also made remarkable progress. In 1924 the Government, desirous of encouraging and facilitating the co-operative marketing of home grown farm produce, introduced a scheme of long-term loans on very generous terms to facilitate the acquisition of premises, plant and equipment by new or existing societies engaged in marketing, and Parliament granted the setting aside of a sum of money for the purpose. An idea of the extent of the co-operative marketing movement may be obtained from the following figures given by a Report of the Minister of Agriculture and Fisheries published in 1925¹ :

Commodity handled	Number of societies	Turnover £
Dairy produce ...	... 63	1,447,627
Eggs & poultry ...	... 43	349,262
Fruits & Vegetables ...	... 18	301,932
Livestock ...	... 9	375,128
Auction marts (livestock) ...	... 18	1,081,953
Slaughter houses ...	... 11	415,270
Bacon factories ...	... 6	694,826
Wool ...	... 13	200,000
Total ...		4,865,998

A description of the working conditions and activities of some of these co-operative undertakings will be not only of great interest but also highly instructive. We propose, therefore, to

¹ Co-operative Marketing of Agricultural Produce in England and Wales (Ministry of Agriculture and Fisheries).

give below a brief description of a few typical examples of some of these societies.

Example of a dairy society

Among the 63 milk and dairy produce societies given in the above table only 17 are working on a contract basis with members, the rest relying upon their members' good faith in this matter. The largest society dealing mainly in liquid milk is the Sturminster Newton and District Farmers having at the time a membership of 486 representing the majority of the farmers in the area of its operation, a share capital of £19,822 and a turnover of £173,903. The Society collects, cleanses, pasteurises, cools and despatches its members' milk to the outlets it has secured among retailers, converts surplus milk into cheese and pays its members monthly the actual amounts received for the produce sold less the estimated handling charges. The main factory is capable of handling 6,000 gallons of milk per day and converting 2,000 gallons a day into cheese. It is situated close to the railway station where a special siding is provided. The Society performs another service for its members by carrying on a small business in farm requisites. In 1923 the liquid milk sold amounted to 2,376,583 gallons..

Example of an Egg and Poultry Society

The Framlingham and Eastern Counties Co-operative Egg and Poultry Society, which grew from very small beginnings is a typical example of English egg and poultry societies having at the time of report a membership of 5,537 and a share capital of £14,638 and a turnover of £160,822. The main area of the Society's operation comprises the counties of Lincoln, Cambridge, Norfolk, Suffolk and Essex. It has 43 collecting depots distributed over its area besides its headquarters and collecting depot at Ipswich. All bad eggs are returned to the producers. At first the policy of stamping the eggs was adopted. Each member was supplied with a small rubberstamp bearing a distinctive number and letter, so that every egg could be traced back to the member concerned if necessary. Later

on the method adopted to enable bad eggs to be traced back to the original senders has been for each member's eggs, as collected, to be retained in separate containers which are ticketed with the member's name. The eggs, after collection, are sorted, tested, graded and packed at the respective depôts whence they are despatched directly according to instructions from headquarters. The system of despatch from various centres, instead of from one Central depot, ensures the receipt of the eggs in the freshest possible condition by the customers. A large trade in preserved eggs is also carried on by the Society. The preserving facilities at the headquarters are unique. Large reinforced concrete tanks built on the American Kahn system, measuring approximately 8 ft. long by 7 ft. broad and $7\frac{1}{2}$ ft. deep have been installed in a large building at Ipswich. These tanks have a total capacity of holding $3\frac{1}{2}$ million eggs.

Like the dairy societies, there appear to be no contracts with the members who deliver to the societies at will. Further it is a widespread practice to buy eggs from members as well as non-members on the same terms. As a result, there have been many instances of various forms of disloyalty.

Example of a Fruit Marketing Society

As regards the co-operative fruit and vegetable societies of England, it must be admitted that there can be no parallel between their results and the spectacular achievements of some of the widely known American enterprises in the field of co-operative marketing of fruit and vegetable. The Pershore Co-operative Fruit Market represents a type of English societies controlling co-operative auction marts in producing districts. It had in 1925 a membership of 609, a share capital of £10,721 and a turnover of £65,112 in fruits and vegetables. The trade-mark adopted by the Society is a device of 4 P's, signifying "Pershore Product Properly Packed". Good packing is encouraged. The Society is giving an extended trial to an innovation which is a shock absorbing system of card board

liners adaptable to any of the baskets used. The device has been patented and will prevent bruising.

The Society has inaugurated a scheme of providing short term credit facilities to the growers. Under the scheme the growers may obtain advances up to one-third of the estimated value of their growing crops. The society is operating successfully but the best results are not being obtained owing to the absence of any agreement with the members for the delivery of supplies.

Example of a wool marketing society

The Kent Wool Growers' society may be mentioned as an example of co-operative wool marketing society. The collecting centre is at Ashford. The farmers are required to shear their sheep carefully on a clean boarded floor to prevent loose dirt or grass getting into the fleece. Bags are supplied by the society for the packing of the wool ; when the wool arrives in the Society's depot it is carefully classified and graded. It is then repacked into bales according to class and becomes the Society's wool, bearing its own brand and label. The farmers are made an advance by the Society amounting to two-thirds of the estimated market price for the various wools within seven days of their wool being received by it. These interim advances are provided by the bank on the security of the wool itself. But in the early weeks of each season when the Society's warehouses are not filled, the bank advances have to be backed by a personal guarantee of a few members of the management committee. After the wool has been classed, baled and the sheets stencilled with the grade, quality and the brand K.W.G. (Kent Wool Growers), a 5 per cent. sample of each grade is forwarded to London to be sold by London brokers at the Coleman Street Exchange. As in the other types of societies, here also, members are not required to enter contracts to deliver their fleeces over a period of years.

The foregoing description brings out the salient feature of the co-operative marketing movement in England. It will be seen that in sharp contrast with the movement in America,

absence of any contract or agreement with the members for the regular delivery of supplies is the rule rather than the exception in England. This is a weakness which, unless removed, may stand in the way of the future development of the movement. As regards the extent of the movement, India, a pre-eminently agricultural country, has still to learn a great many lessons from England. The movement in England is very young and dates only from the years after the Great War. But although in its infancy, co-operative marketing has achieved some results there which it may need years of effort for us to obtain. At the same time it must be remembered that the development is still officially considered not at all sufficient for the country and the Ministry of Agriculture is taking various steps to encourage a further extension of the movement.

The position as narrated in the preceding pages may be usefully compared with that in India generally and in Bengal in particular. Although the rural co-operative credit movement has extensively grown in India, there has been a meagre development of marketing and other non-credit agricultural societies. The most successful co-operative marketing societies in India are the cotton sale societies in the Bombay Presidency—the two most prominent being the Gadag and Hubli societies working in the Dharwar District. They deal mainly with the organisation of *kapas* of the two improved varieties introduced by Inspectors of the Agricultural Department. The auctions which they organise periodically have been well attended in the past by representatives of mill owners and experts. The growers have been immensely benefited by these societies as they have obtained all the advantages of honest weighments, a full knowledge of the rates paid and a premium for improved varieties. Naturally the societies aroused the jealousy of the local brokers whose business began to be affected. Within a few years of its starting, the Gadag Society came into collision with the local middlemen who organised a boycott against it. In the beginning the boycott was not effective but became so in 1925. The membership was growing but ceased to increase since 1924. A compromise was sought and with that end in view a con-

ference was held between the buyers and the Agricultural Department to come to the agreement that only members' goods of improved quality would be sold by auction.

In Bengal no serious attempt seems to have been made to develop co-operative marketing. The jute sale societies attracted at one time a great deal of public attention and it was believed that they would render useful service to the cultivators. The first Jute Sale Society was registered in Sarisabari on the 25th August, 1924. Subsequently other societies were registered in Chandpur (30th June, 1925), in Alamdanga (30th June 1926), in Sirajgunge (20th July, 1926), in Sonatala (14th September, 1926), in Shazadpur (21st September, 1926), in Narayan-gunge (8th October, 1926), in Chaumuhani (8th October, 1926), in Akhaura (27th October, 1926) and in Madaripur (12th January, 1927). But the history of the jute sale societies is not at all happy. It does not appear that they had been worked on sound and proper business lines. The organisation and method of working were highly defective. The importance of insisting on the cultivators to sell all their jute to the societies was hardly recognised and hence not introduced in the scheme. The experience of America points to the fact that the success of a co-operative marketing association depends on an "ironclad" agreement with the producers that they must bring all their produce to the societies. The losses in the past have been very high and, as the Bengal Banking Enquiry Committee points out, nowhere except in Sonatala in 1928-29 had the cultivator received a higher price than that prevailing in the market.

A number of paddy sale societies have also been established in several parts of Bengal but not on so large a scale as the jute societies. The Gosaba Society has established a rice mill at its headquarters where the collected paddy is husked and the cleansed rice is despatched for sale. It is working fairly successfully.

We consider that the establishment of co-operative marketing societies will prove of immense benefit to the poor farmers of Bengal. If run on right lines, they have undoubtedly immense possibilities. Proper attention should always be

directed towards the organisation and the method of working of sale societies. .

There are two methods of organising these co-operative marketing associations. It may be done either by farmers or by outsiders in local units or in the central units. A central agency may be built up by outside organisers planned by experts in marketing for the growers ; or it may be a federation of numerous local units slowly evolved by farmers in local communities. The famous California Fruit Growers' Exchange is a federated Exchange—"the result of sustained efforts of farmers to co-operate in small communities." It had its origin in the local associations composed of the growers themselves. The local associations were federated into district exchanges and then district exchanges were ultimately federated into a Central Exchange. "The grower picks, the local association packs, the district exchange bills and the Central Exchange sells the fruits". The Central Exchange controls to-day three-fourths of the entire citrus fruit crop, counts more than 10,700 members and includes 216 local associations scattered throughout California. The California Prune and Apricot Growers' Association is on the other hand an instance of a leading centralized association built up by non-farmers. The growers' organisation has doubtless great advantages but the central agency has the benefit of the expert's service and it can be very quickly formed. The Prune and Apricot Growers' Association in California was organised in four months whereas it took 17 years to build up the Fruit Growers' Exchange.

There are three main types of co-operative associations, viz. .

- (1) the independent local association
- (2) the federated exchange
- (3) the centralized association.

The federated exchange may again be sub-divided into one that is formed by local associations and the other that is formed simultaneously with local associations. In the former there is a contract between the grower and the local association

and another between the local association and the selling exchange. In the latter each grower signs two contracts, one with the Central Exchange and the other with his local association.

The centralized association may again have two forms, one with local units and the other without them. Federated associations are more democratic than centralized associations. But it is never true to generalize that the federated association always succeeds and the centralized association always fails or that the former is always democratic and the latter always autocratic. Much capital has been made of the failure of the supposed centralized associations, viz. the California Rice Growers' and the California Honey Producers' Co-operative Associations and the California Alfalfa Growers' Exchange. But really speaking they were all federated. Again, the centralized associations of California seem to be more inclined than the federated to conduct their elections on a democratic basis. While 85 per cent. of the centralized associations have adopted the system of one-man one-vote, the federated associations prefer an one-acre one vote or an one-ton one-vote system. In both, the sales agency is chosen by the board of directors, who again are chosen by the members.

There are two questions which need careful consideration in connection with the organisation of co-operative marketing societies. They are

(1) Should the society be organised on a single purpose basis or on a multiple commodity basis?

(2) Should there or should there not be a contract with the farmers to supply stipulated amounts to the society at regular intervals?

Let us take the second question first. The opponents of the contract system have generally argued that "coerced co-operation secured by an ironclad agreement is little better than no co-operation at all". If the farmers are not willing to co-operate voluntarily, it is no use fettering them to this association by an unbreakable legal tie. But under modern conditions of co-operative marketing, it is essential that there should

be a contract. From the point of view of the association, it is obviously advantageous to have a contract. Without one, it is never possible for it to know the approximate quantity of business it will be required to handle. As a result there will be enormous difficulties in arranging its financing, advertising and merchandising policies. Again, in case of a contract being insisted upon the middlemen or other enemies of the association will not be able to deplete its membership by quoting the growers a tempting price. The packers attempted to wreck the Burley Tobacco Growers' Association by offering to the growers 10 to 12 cents more than the price offered by the Association but they could not induce more than 400 out of 17,000 members to break their contract. On the other hand the tonnage handled by a large association operating without a contract, viz. the Ohio Sheep and Wool Growers' Association was reduced from 6 million lbs. to 3 millions lbs. by a similar policy pursued by dealers. From the grower's point of view, the contract system also has some advantages. The burden of the disloyal member has not to be borne by him.

In Canada and Australia many large co-operative marketing associations are working without a contract basis. But the great bulk of the associations in the United States are operating with a contract. For example, the Arkansas Rice Growing Co-operative Association is working on a five-year contract, the Pacific Rice Growers' Association on a one-year contract, the Oklahoma Cotton Growers' Association on a seven-year contract, and the Burley Tobacco Growers' Association on a five-year contract.

As regards the first question of the single or multiple commodity basis, the experience of America and Denmark shows that co-operative marketing becomes most successful when it is organised on a single commodity or at the most closely allied commodities. In America the joint handling of more than a single commodity has generally been attended with disaster. Denmark which is unique among the European countries in the use of the single-purpose society has achieved remarkable success with it. The other countries of Europe are steadily adopting the American and Danish practice of grouping about a single

commodity and in many instances have obtained successful results.

The suggestions that we would like to make in this connection are :

We should immediately organise co-operative associations of the type known as Federated Exchange formed by local associations. In every village small societies should be federated into district exchanges and all the district exchanges should ultimately be federated into a central exchange. The organisation should strictly be on a contract basis. Co-operative marketing associations organised on the single-purpose and contract basis will be the right type of societies for Bengal. These associations should always endeavour to grade and standardise the produce and by a thorough system of instruction and inspection should teach the growers the proper mode of handling and packing the produce. They may also introduce "brands" to attract buyers just as they have done in America in the case of "Sun-Kist" oranges and "Sun-Maid" raisins. They should be equipped with warehouses and also aid in financing by endorsing warehouse receipts and by giving the banks adequate collateral.

We have already referred to village organisations in connection with rural indebtedness and agricultural finance. The village co-operative Sale Societies may be associated with or affiliated to the village organisation. The latter will be able to offer storing space and grading facilities. Above all, the question of financing will be simplified by this arrangement. As stated before, the Sale Societies are expected to pay a part of the price of the crops to the producers when they bring their produce to the societies' godowns. If the societies have their own financing arrangement, the village organisation can work as their financial agent and make advance to the producer. If, on the other hand, the Sale Societies depend on the co-operative banks for finance, the machinery becomes simpler as the village organisation is the village agent of the various types of co-operative institutions.

It is gratifying to note that the Central Government is

taking an interest in the problem of agricultural marketing. A Conference was recently held from April 3 to 6, 1934 and from a Government resolution on economic planning issued by the Finance Department, we find that the discussion in the conference resulted in general agreement that of all the practicable measures for improving economic conditions, an intensive programme for developing marketing facilities for agricultural products offered the best immediate prospect of substantial results. The following issues arising out of the problem of agricultural marketing were carefully discussed :

(a) How can the demand, both internal and external, for each individual commodity be promoted?

(b) How can the gap between the prices paid by the consumer and those received by the producer be reduced and the agriculturist's share of the final price increased?

(c) How can the agriculturist be protected from those seasonal slumps in prices of commodities which are occasioned by the fact that whilst the consumption is spread more or less nearly over the year, the harvesting and marketing are concentrated in a relatively short period.

(d) How can the agriculturist be most cheaply and safely financed (i) for the production, and (ii) for the marketing of his produce?

The action to be taken to deal with the above problems, it was decided, should include propaganda and the supply of information in external markets regarding Indian products ; the grading, sorting and bulking of the main staple products ; special market organisation for perishable commodities ; information to Indian producers of consumers' requirements both in India and abroad ; the planning of production on the basis of quality and demand ; the establishment and development of regulated markets ; the undertaking of market surveys for the purpose of developing a common plan throughout India, the establishment of properly organised "futures" markets, commodity exchanges, and ware-houses.

"As regards the organisations which should be set up to secure the objects noted above, the Government of India

consider, in agreement with the general conclusions reached at the conference, that in regard to each individual commodity (or group of commodities) marketing will have to be studied from a number of aspects, and that, while Government assistance will be required for the initial steps, the ultimate objective to be aimed at will probably be to establish special 'commodity committees' (on the lines of the Indian Central Cotton Committee) each charged with the improvement of the marketing of a particular commodity or related commodities".

With this end in view the programme provisionally accepted included the following initial steps :

- (1) The appointment of a central marketing officer by the Government of India ;
- (2) The appointment of provincial marketing officers ;
- (3) The inauguration of provincial marketing surveys ;
- (4) The appointment of special committees for staple crops starting with oil-seeds and tobacco ;
- (5) Work on grade standards under the direction of the Imperial Council of Agricultural Research.

As the programme is a matter of all-India importance the Government of India propose to provide the bulk of expenditure from their own resources.

"The steps outlined above have been stated with primary reference to the marketing of crops, but the marketing surveys will also include animal husbandry products. It is accordingly proposed that the central marketing officer should be assisted by a deputy and two assistants to deal with animal husbandry products."

"Further, as regards dairy products in particular, in order to study the problem involved in their preparation for wider markets it is proposed to supplement the Imperial Institute of Animal Husbandry and Dairying at Bangalore by the addition of a Dairy Industry Institute which will include a laboratory for carrying out research on the physical and chemical properties of Indian milk and its reactions to the various forms of processing and transport under Indian condition".

It has also been proposed to establish provincial dairy committees to study and develop local marketing arrangements.

The scheme thus adumbrated is elaborate and wide enough to include the various problems of marketing. The services of an expert (Mr. A. M. Livingstone, Senior Marketing Inspector of the Ministry of Agriculture in London) have been requisitioned and he will be here for three years. It is needless to say that India, though it may be within the ample range of his genius, lies outside the arena of his exact knowledge. To make up this deficiency he will be assisted by a staff of Indian officers of experience in the Agricultural Departments of both the Government of India and the Provinces. The Provincial Marketing Officers will not only be in liaison with the marketing organisation centre but will also carry out a measure that is preliminary to the establishment of all-India marketing grades, namely, provincial surveys of principal commodities of trade.

The question of fixing standards that should be recognised all over the Empire was, as is well known, one of the prominent topics discussed at the Ottawa Conference. Such a course would facilitate increase of India's overseas trade and the fixing of grades and standards provincially and then for all India.

It is to be hoped that when the expert leaves India at the end of three years, improved marketing methods would be introduced. But in the matter of marketing, every province must, to a considerable extent, develop along its own lines and according to its own peculiar conditions. To give only one instance, jute is practically a monopoly crop and as long as it is in demand the world must come to Bengal for its supply of the fibre. But almost every country is trying to find cheap substitute for jute which she can produce, i.e. for which she will not have to depend on far off Bengal. If Bengal, therefore, is to retain the monopoly and to extend her trade in jute in accordance with the variations in world demand, she must see to it that the cost of production and marketing is reduced to a minimum and that outlets for her

produce which have hitherto been open are not closed against her but, on the other hand increased. Special arrangements have, therefore, to be made for jute. And that must be done in Bengal by a scheme evolved in the Province. Regional markets and marketing officers will be necessary and the whole organisation controlled from a central bureau as in the case of financing. This bureau will act in close co-operation with the Central or Provincial Bank.

A complete scheme for improved agricultural marketing in Bengal on the lines indicated above should be immediately adopted. The most important part of the scheme is, as we have already stated, the establishment of co-operative marketing societies. The salvation of the farmers lies in these societies, properly organised and properly worked. The produce will be correctly weighed, carefully graded, properly packed, suitably stored and safely transported. Above all, the farmer will have a better price, the middleman will not be able to place him in a position of helpless dependence, as he is doing now. The State is directly concerned in the welfare of the agriculturists and must see that the producer's share of the proceeds represents a reasonable proportion of the price the consumer pays. The Government should, therefore, in our opinion, assist in the development of these marketing societies in Bengal. We are not for a moment suggesting by this that the co-operative movement should be "State-fed, State-led and State-dominated" but that there must be some encouragement from the State. The poor defenceless, illiterate farmer cannot be left wholly to himself. The theory that co-operation must be originated by farmers and should be carried on entirely by them is not always workable. In Germany, Holland, Belgium and Denmark, the State has always evoked and supplemented the movement. In the United States and France the State has played a more active part in fostering co-operation. In England also the Government is assisting, by advancing loans, the agricultural co-operative enterprises engaged in the marketing and preparation of farm produce.

In Italy "the co-operative processing of agricultural produce

is most widely developed in dairy farming. In raw silk production, wine-making and tobacco-growing it is well established and is making rapid progress under the encouragement of the Farmers' Union, the Co-operative Union, the respective technical associations, the travelling schools and a liberal State credit policy". Mussolini has defined his attitude towards Co-operation. It must not assume any political activities, but he affirmed—"all my sympathy with those forms of co-operation which, conscious of their high social mission, holding themselves above the passions of politics and religion, act as an act of defence against the greed of speculation".

In Bengal an active policy of fostering co-operative marketing organisations is urgently called for on the part of the Government.

CHAPTER X

PISCICULTURE

The members of the Indian Industrial Commission said in their report :—

“We are very decidedly of opinion that the development of fisheries in Bengal should be taken up fully and energetically and that the executive staff of the department should be considerably improved and strengthened.”

But unfortunately for the people of Bengal the fisheries department has been closed in spite of the remarks of the Commission to the effect that an immense future awaits an active development of the Fisheries.

That the supply of fish in Bengal is not equal to the demand cannot be gainsaid and as far back as 1906 Mr. K. G. Gupta, I.C.S. was deputed by the Government to conduct an exhaustive enquiry into fisheries in Bengal and the possibilities of improving the industry in the Province. The importance of fish as food in Bengal has been fully recognised. Its protein content is on an average 14—16 per cent and it is better than meat in being more easily digestible. And we cannot get a sufficient supply of fish in Bengal. Let us take the case of Calcutta with a population of about 13 lakhs. To keep fit one requires 30—40 grams of good protein daily and even if one depends on fish for half this quantity, one must have 2 *chittaks* of fish daily. The Calcutta supply is hardly 10—12 thousand tons a year against 42 thousand tons necessary to provide on an average 2 *chittaks* per head per day. No wonder the price is unnecessarily high which places fish beyond the reach of a large section of the people.

But Bengal and India afford splendid opportunities for the development of the industry. There are numerous irrigation tanks in Bengal besides tanks for the supply of drinking water. The acreage of land in Bengal under rice crop is 2,291,100

acres and under jute 2,310,300 acres. Rice and jute require water almost all the time during the season. Where there is water there is always a chance of raising some sort of fishery. In Japan the bulk of the fresh water fishes comes from the rice fields. In Bengal the acreage of land still available for cultivation and cultivable waters other than fallows would be about 10,000,000 and 6,200,000 respectively. A considerable portion of this can be utilised for pisciculture. If the average yield of rice and jute fields be estimated at Rs. 10 per acre they will produce about Rs. 41 crores a year. The fisheries of England and Wales yield about Rs. 251,295,000, France Rs. 126,000,000, Japan Rs. 528,000,000 and Canada Rs. 168,000,000. From these figures we can easily form some idea of the wealth that can be produced from pisciculture in Bengal. But what is the actual state of affairs in this Province? Not only cannot the people have enough of fish but one finds that we are actually importing preserved and canned fish into Bengal. We give below the figures for the value of imported fish during the five years preceding the setting in of the present depression :—

Dry Fish

1923-24	...	...	Rs. 4,080
1924-25	...	...	„ 31,174
1925-26	...	...	„ 30,635
1926-27	...	...	„ 34,780
1927-28	...	...	„ 72,783

Canned Fish

1923-24	...	...	Rs. 133,159
1924-25	...	...	„ 185,707
1925-26	...	...	„ 198,082
1926-27	...	...	„ 204,743
1927-28	...	...	„ 226,724

These figures show to what extent the industry can be developed in Bengal. But the Department of Fisheries, Bengal,

Bihar and Orissa did not—during the years it had been in existence—bring about any improvement in the existing situation. They supplied carp which they did not culture and they could not induce intelligent and educated people to develop the industry on scientific lines. Carp culture has been carried on in this Province for a long time but never on anything approaching scientific or practical lines. The carp culturist thinks his part of the work finished where the fish culturist's duties really begin in other civilised countries. Here the tank-owners who usually culture carp simply procure the fry and liberate it into their large and only kind of tanks, thereby thinking that they are replenishing the stock of fish in the tank and expect to have grown up fish after some time. The results in such cases are and must be disappointing.

The causes responsible for the failure of carp-culture are numerous. The tanks have seldom or never been cleaned from the time of their excavation and the water was never drained off and the tank-bottom which is covered with dirty mud never has had a chance of drying. The plant life in most of the tanks is not of a type that would serve as food to the young fry, but rather is a very strong competitor for the very small quantity of food available in these tanks and further the lower forms of animal life which form the greater part of the food of the carp do not flourish in such waters. The tanks always contain large number of predatory fish besides grown up carp, which find the young and helpless fry a very useful addition to the meagre quantity of food supply. No attempts are made at artificial feeding of the fry and of replenishing the food materials in the tanks and at the time of stocking absolutely no attention is paid to the available food supply with the result that very often the food in a tank is not enough for even half or a quarter of the quantity of fry stocked. Until the carp culturists take more interest in the culture of carp and materially modify their working methods there is little hope of any advance being made. A good deal of money is thus wasted on buying young fry, which, on liberation into the tanks, either fall an easy prey to the voracious carp and the predatory fish

or die for want of enough food—the growth of the few that do survive being very stunted.

And this is the case when there is money in pisciculture. The four principal species of carps, Rohi (*Labeo rohita*), Katla (*Catla bushanani*), Mrigal (*Cirrhina mrigala*) Kalbous (*Labeo calbous*) grow rapidly, specially the katla, and in a tank examined the result of a haul was observed as follows:—

	Length	Weight
Katla—present season ...	4"	
„ —last season's ...	9" to 10"	$\frac{3}{4}$ seers
„ —year before ...	12"	2 $\frac{1}{2}$ „

The rate of growth is apparently much quicker in the second year. The average weight of a two-year carp may be taken at 1 $\frac{1}{2}$ seers, and assuming that no more than half the number put in or 500 survive at the end of two years, the total weight would be 750 seers; the size of the tank being 150 ft. square. The value of the fish at 4 annas (a ridiculously low price) is nearly Rs. 190. The account will then stand thus:—

Debit

1000 fry ...	Rs. 15
Payment to fishermen for dragging ...	„ 30
Miscellaneous ...	„ 5
	—
Total ...	Rs. 50

Credit

Value of 750 seers of fish at 4 annas	
a seer ...	Rs. 190
Net profit ...	„ 140

This is a very low estimate. If the tank is regularly stocked every year, a clear profit of Rs. 100 to 200 per annum may be ensured with a minimum expenditure of money or trouble.

But modern research and the study of methods adopted in other countries would be of great help to us.

"The importance of the fresh water fisheries of Bengal cannot be overrated. In spite of the adverse agencies at work, the fresh water surface, as represented by the numerous river-beds, old and new, and by the innumerable *jheels* and tanks, is still enormous, and should, with proper care and attention, be able to add largely to the fish supply. In most civilised countries it has been recognised that water, properly cultivated, is as important an agency in supporting human life as are its crop-laden acres, and this object is sought to be attained by measures, which broadly fall under two classes, viz., propagation and protection".

For propagation various methods are in use, the principal of which are given below :—

(1) Simply gathering the fry in streams and putting them in rearing tanks where they are allowed to grow until they are required for use. This is the method in vogue in Bengal.

(2) Collecting floating impregnated eggs or spawn of various kinds with pieces of cloth and transferring them to small shallow ponds, where the fry are hatched in a few days and at once divide and begin to swim in separate shoals according to their species. They are then sorted and put in separate ponds. The fry are largely utilised for stocking tanks and are sometimes conveyed to long distances. This method is generally found in the suburbs of Calcutta and in the neighbouring districts of 24-Pergunnahs, Howrah and Hooghly. The impregnated eggs float in small lumps near the edges of rivers and are collected in a piece of cloth. They are bought by the rearers and put in shallow ponds where they hatch in a few days. In about a month's time it becomes possible to distinguish the various kinds. The fry are then caught with fine nets, sorted and put in different tanks ; and at the same time some are disposed of to hawkers who carry them about for sale to stockers of tanks.

(3) The European and Japanese method of culturing carp is thus described by Sir F. Nicholson :—"Get a few parent carp (Reproductives) and keep them separately by sexes in separate ponds ; at spawning time net out the ripe fish of

both sexes and place them together in sprawling ponds provided with floating water weeds, etc. ; in these weeds the eggs are deposited and fertilised and the fry emerge in a few days ; the parent fish are fertile for many years and an immense stock of young fry is obtained every year with a minimum of expense and trouble. The young carp whether a fry of 1" or 2" long or as yearlings of 6" or 8" or more, are readily transportable to long distances in damp moss or straw or in suitable tubs". This method is not in use in Bengal. The carps form the most valuable of the fresh water fishes of the Province. But the prevalent belief is that they do not breed in ponds, tanks or other confined waters. As a matter of fact the European and Japanese practice of keeping the parent fish separately by sexes in separate ponds and only at spawning time putting the ripe ones of both sexes together has never been tried. It is certainly worth trying, and there is no reason why the practice which has proved successful in Japan would not be successful in Bengal.

(4) The elaborate and highly organised hatcheries in which artificial propagation on a large scale is undertaken, exist in Great Britain chiefly for salmon and trout, and in the United States and Canada for all kinds of fish, freshwater and marine. "In America the hatcheries are used not only for stocking ponds, but what is of special interest to us in Bengal, in systematically replenishing the large rivers and lakes, many of which have by this means been restored from a state of exhaustion to one of great abundance exceeding that which unassisted nature ever achieved before." In one year Canada distributed 653 millions of fry from 32 breeding establishments and the United States hatcheries supplied 1,037 millions of fry besides nearly 200 millions of impregnated eggs, fingerlings, yearlings and adults."

The United States Fish Commission operates stations at Bryan points, 12 miles below Washington on the Potomac, and at Battery Island while a steamer, fitted up as a floating hatchery is engaged during the shad season on the Delaware River. These two stations, and the vessel could receive even twenty years before, respectively, 16,000,000, 40,000,000 and 12,000,000 eggs. On more than one occasion each had been taxed to its utmost

capacity. In 1897, 205,000,000 eggs were taken from which 134,545,000 fry were hatched. In 1898 the total of shad fry hatched was 156,150,000 and in 1899 it was 210,493,000. The shad is found in abundance in Bengal and is known as *Ilish* or *Hilsa* in the Province. In lower Bengal proper, it comes up the various mouths through which the Ganges debouches into the sea and are most plentiful in the Hooghly, the Rupnarayan and the Padma. The fishermen of Bengal believe that the *Ilish* does not spawn in the rivers, and in support of their opinion assert that no fry or young ones have ever been caught or seen. But after what America has achieved in locating the spawning grounds of the fish and in successfully undertaking artificial propagation, sustained and systematic endeavours should be made to see what can be done with the *Ilish* on those lines. "Strenuous efforts must also be made to observe the productive functions of the *Hilsa* and ascertain their spawning grounds, so that when their anadromous character has been established, hatching stations may be opened to introduce artificial propagation for replenishing our rivers." This observation was made by Sir K. G. Gupta in his Report on the Results of Enquiry into the fisheries of Bengal and into Fishery Matters in Europe and America published in 1908. Looking across the wasted years—more than twenty-five years—one cannot help feeling despondent at the utter neglect that has characterised us in the matter of developing the fisheries of Bengal and the fishery industry of the Province.

In Bengal special advantages would accrue by growing fry by pond culture. The fry so raised would be had cheaper than those got from the rivers and this will result in the practice of gathering fry and spawn from the rivers diminishing *pro tanto*. The benefit to the rivers would be incalculable ; for there is no question that one of the main causes of the falling off in the supply of carps in our rivers is the capture of fry from them. In the waters of the United States where the carp fry are not liable to capture and the young fish are protected from destruction, carps increased to such an extent that in less than thirty years of their first introduction, the supply

rose to over 20 million pounds a year, the city of New York alone consuming more than nine million pounds. The price paid to fishermen is about $1\frac{1}{2}$ anna a seer there. "If the system of getting the carp to spawn in ponds can be successfully introduced in Bengal, and at the same time measures are taken to prevent the destruction of fry and young and immature fish, there is every reason to hope that the growing scarcity of these valued fishes in our rivers would soon be a thing of the past." Had the suggestion put forward by Sir K. G. Gupta about thirty years back been given effect to we could have, by now, been getting fish at about 3 to 4 annas a seer. But the wheels of progress move slowly in India and things here have been allowed to drift for want of a policy.

Before leaving the subject of propagation we would like to draw the attention of those interested to what has been actually achieved in the matter by the United States Government.

The annual report of the Commissioner of Fisheries (Bureau of Fisheries) to the Secretary of Commerce for the fiscal year ended June 30, 1930 throws a flood of light on the subject :

"The summary of output of fish and eggs from the various fish cultural stations constitutes a source of gratification in that a new high record has again been established. The total of 7,570,482,300 shows an increase of almost 500,000,000 over the production for 1920 while the increase is very largely accounted for by an augmented output of marine forms, the eggs of which are available in tremendous quantities, there was also an increase in practically all the game varieties and certain of the other commercial forms. It is noteworthy that the production of most varieties was held close to previous levels despite a marked increase in the output of fingerling or large fish, which require extended space and normally reduce the numerical output of hatcheries. The output of fingerlings for 1930 was 250,170,300 representing an increase of practically 85 per cent over that of the previous year".

The following tabulation indicates the production of the various groups of species during the year :—

				Summary of output
Game species	...	...	...	205,147,000
Commercial species (interior waters)	...	...	...	524,120,900
Ditto. (anadromous)	...	...	...	304,140,100
Ditto. (Marine)	...	...	...	6,511,367,000
Miscellaneous species	...	...	...	25,707,300
				<hr/>
				7,570,482,300

Protection is necessary to increase the supply of fish. The promiscuous netting of fish and fry and fingerlings is a serious danger. "In the course of our tours" wrote Sir K. G. Gupta in his report, "we have seen whole baskets containing them (fingerlings) exposed for sale. The amount of reckless waste that thus takes place is much to be regretted, for it must largely account for the growing scarcity of the better sorts". The utility of protection was fully realised by our people. This will be evident if we take the case of the *Hilsa*. In Bengal the Hindus refrained from eating the *Hilsa* from the last day of the Doorga Pooja (sometime in October) to the day of the Saraswati Puja (end of January or beginning of February). Thus there was a close season from about the middle of October to the end of January, which very nearly corresponds to the period when, according to the observations made in the United States, the fish ought to be descending to the sea after completing the act of spawning. "But owing to general ignorance of the meaning and purpose of the injunction it has become the practice to disregard it as one more piece of superstition, especially as all religious sanctions have lost much of their force". It is certain that if no remedial measures are adopted, in course of time the *Hilsa* would diminish in Bengal as was the case in the United States in 1879. The only way of reintroducing the close season is by penalising the capture of the fish, say from the middle of October to the middle of February. The license granted under the Arms Act rules

enjoins close seasons and there is no reason why similar should not be the case with fish. The basis and aim of fishery legislation may be said to be threefold. These are

- (1) The interest of the fish,
- (2) The interest of the industry,
- (3) The interest of the State.

The laws themselves may be classified as follows :—

- (1) Laws designed directly to preserve and protect fish.
- (2) Control of the fisheries in the public interest.
- (3) Laws to facilitate the migration of the fish to and from their feeding and breeding ground.
- (4) Regulation of the nature of precautions.
- (5) Preventing injurious influences affecting fish life, such as river pollution which has become a positive danger because of jute steeping in moribund rivers where dead fish have been seen floating on the waters on account of river pollution.

The first would

- (a) enforce certain close seasons ;
- (b) define a minimum size limit below which none of the kinds of fish specified would be taken, with the object of protecting immature and undersized fish until they breed ;
- (c) regulate mesh of net with the object specified in clause (b) ;
- (d) prohibit the taking of sprawn, the catching and killing of fry and of small sized fish of any specified species ;
- (e) reserve and set apart special areas of water for encouraging the propagation of fish.

America has now provided a Five-year Construction and Maintenance programme for the Bureau of Fisheries. The Act of 1930 authorised additional appropriations for new fish cultural stations and sub-stations, three new laboratories and two new distribution cars. It also authorised annual increases in the appropriation for the division of fish culture and increases in present appropriations for the divisions of scientific enquiry

and fishery industries. Under the provisions of the Act the Bureau may co-operate with States, countries, municipalities, individuals and public and private agencies, organisations and institutions, and may accept donations of lands, funds, and other aid to the development of the programme. The Commissioner of Fisheries has expressed the hope that "the provision for an orderly development of its fish-cultural and other agencies will have a far-reaching effect in placing the Bureau in position to meet the demands made upon it, and the provisions for increased personnel will be extremely helpful in building up a staff of experts capable of coping with the situation".

The supply of fish from the Bay of Bengal requires attention. We give below an extract from Dr. Alcock's Report :—

"The sea fisheries of the Bay of Bengal, are of a value well nigh incalculable. That they are unknown, uncared for and unappreciated is unfortunately true ; but it is equally true that they will prove a mine of wealth to whoever may have the enterprise to exploit them, and the tenacity of purpose to work them in the face of the apathy and incredulity that at present exists regarding them."

Much water has flowed down the Ganges since the experiment with the trawler *Golden Crown* was undertaken and ended in failure. There were various contributory causes to the failure of the scheme which can be remedied. Since the extract quoted above was written the problem of carriage from sea to market has yielded to human effort. Motor lorries have been introduced and Railway lines have been opened. Proposals—ambitious but not impossible—are now and then mooted to use the aeroplane to provide Calcutta with fresh sea-fish every morning from Puri. Fast motor boats bring supplies from the *Bheries* and the brackish waters of the estuaries. Ice is readily available. Only the price of salt, instead of going down, has gone up. There is no curing or drying without salt and in all preservative processes salt is the chief ingredient used. Salt must be cheap and salt required for use in connection with the industry should be relieved of all duty. The Government of

Bengal will have to build up the sea-fishing industry by direct or indirect help till private enterprise takes it up.

There are important industries connected with the fishery industry. Prominent among them are—

(1) Isinglass prepared from the air bladders of certain fishes. It is a valuable economic product and the manufacture of isinglass affords a tempting occupation to any one with a small capital.

(2) Oil. Before the introduction of cheap kerosine oil, fishermen in parts of the Province where fish was cheap and abundant and difficult to dispose of because of transport difficulties, used to prepare oil from fishes, chiefly for burning. The industry owes its origin in Madras to the labours of Sir Frederick Nicholson. Modern machinery which would eliminate waste in the process of manufacture would not cost more than Rs. 500 for a daily output of one ton of oil. The oil can be deodorized and also 'Hydrogenated' i.e. hardened. When "hydrogenated" the oil becomes white, odourless and hard in consistence. The oil can be used for the manufacture of soap, the demand for which is on the increase.

(3) Manure. The value of fish manures has been recognised in places like Darbhanga and Mozafferpore where it is used for the more valuable trees such as mangoe, lichi, lime, etc. The manure is sure to have a large demand in the market as orcharding is developed.

Mollusc culture also deserves observation as there is a growing demand for it.

The smoking, curing and canning of fish should be undertaken and teaching imparted to those who desire to learn the processes.

An important adjunct to scientific work connected with the industries would be a properly equipped central aquarium containing both fresh water and marine specimens located in Calcutta. In addition to being a great assistance in the prosecution of scientific research, it would be of immense value as a means of popular education and of arousing public interest

in matters connected with aquatic fauna. The aquarium in New York is largely visited by school children and is rightly regarded as an institution of much educational value. It is to be regretted that students from Bengal have to undertake a long journey to Madras to study the subject in the aquarium there.

The Government of Madras issued an elaborate communique in 1930 after they had received the report of the committee they had appointed to examine the work of the fisheries department and to report on the future policy to be adopted for its working and improvement. In Bombay a comprehensive scheme of development for the fishing industry was initiated by Sir Frederick Sykes who himself made a trip to some of the fishing grounds in an ordinary Bombay *machwa* with a view to obtaining first-hand information of the methods of the local industry and stimulating the interest of the fishermen in its improvement. It is deplorable that in Bengal very little has been done by the Government though recent returns show that 644,000 persons in the Province subsist by fishing and that a further 324,000 are maintained by the sale of fish. The market is almost unlimited. It has been calculated that no less than 80 per cent. of the population consume fish as a regular item of diet when they can afford to buy it ; yet so badly is the industry organised and so hopelessly are the actual fishing population in the hands of *mahajans* and middlemen that an ever-increasing demand remains unsatisfied while the price of such supplies as reach the Calcutta market is maintained at a level which can only be regarded as exorbitant.

An attempt to break the ring of middlemen and *mahajans* by the establishment of co-operative organisation failed. A gentleman who had himself been in the trade has described the methods adopted by the brokers, who, according to his calculation, make a profit of about Rs. 1,50,000 a year. But the failure ought to have made the Co-operative Department discover the causes of the failure and remedy the shortcomings. This was not done. The remarks made by the *Statesman* which expressed its indignation at the attitude of inaction taken

up by the local Government are significant. "The obstacles to development in this as in other directions are well known and their magnitude is recognised ; but there has been a tendency in recent years to rest too comfortably on the pessimistic view that progress is impossible because the compiler of a Government report once upon a time discovered that 'fishing and the fish trade in India are universally relegated to low caste men who alike from their want of education, isolation caused by their work and caste and their extreme conservatism, are amongst the most ignorant, suspicious and prejudiced of the population, extremely adverse to amending the methods of their forefathers and almost universally without the financial resources requisite to the adoption of new methods, even when convinced of their value.' This is true in relation to Indian fisheries as it is true in relation to many things else in India. But it ought not to remain true. Bombay is dissatisfied because although it has been proved that the seas along its coasts can yield catches almost equivalent to those of the North Sea banks, practically the whole Presidency is under-supplied with fish. The position is the same along the whole coastline of India, and it will be changed only when the departments of Government responsible realize, as the Industries Department in Bombay has done, that they are charged with the task of overcoming difficulties, developing a steady increase in production and organizing its supply to every part of the area for whose welfare they are responsible".

The problem in Bengal where the wealth to be exploited lies mainly in rivers, creeks, *jheels* and ponds is somewhat different from that in Bombay but work here also must be undertaken and difficulties overcome. A great deal of excellent work has been done by the Madras Department of Fisheries and Madras can give a lead to most of the sister Provinces. It has been proved that the increase of production is only one—if the most important side of the problem, and that there must be simultaneously an improvement in distribution and Bombay has wisely decided to take up immediately the improve-

ment of transport and railway cold storage facilities. In this respect the problem of fruit and fish distribution is one and the same.

What Madras has done in the direction of improving the fisheries, both inland and marine, and incidentally of increasing the wealth of the province, can be seen from any of the latest reports of the Madras Fishery Department. The province has a department with up-to-date organisation, a first class aquarium and research institutions, not only for studying marine biology but also for observations in curing, marketing, storing, transporting as well as for improving the economic condition of the fishermen. And for these various activities Madras has an adequate staff enjoying facilities for the diverse kinds of work. She has also succeeded in driving away malaria from many parts of the province by suitable stocking of pools and waters infested with mosquitoes. The principal activities of the department, apart from research in Marine Biology, are :

- (1) Selection and breeding of good species
- (2) Periodical stocking of pools and water-holes
- (3) Experiments in new forms of boats for sea-fishing
- (4) Teaching the methods of rapid collection and transport
- (5) Curing
- (6) Canning
- (7) Fish culture
- (8) Supply of Biological specimens.

The other activities of the department are the establishment of fishery schools, arrangement for scholarships to deserving students, co-operation among the fishermen, etc.

As a result of these activities important industries have developed in Madras which are definitely adding to the wealth of the province. A few of the industries are enumerated below :—

- (1) Production of canned fish

- (2) Manufacture of fishmeal—as food for cattle, poultry etc.
- (3) Utilisation of waste as manure
- (4) Fish oil for soaps
- (5) Vinegar—by quick process
- (6) Fish glue
- (7) Paint oil from crude fish oil.

The schoolmaster is abroad with his primer and some of the fishermen are no longer ignorant. But the trade is not in their hands only. There are the middlemen—often up-country men who form a formidable ring which co-operative organisation must break. Modern methods must be adopted in place of methods and practices which have outgrown their period of utility. The Government must come forward to help the people and set an example. Necessary funds must be allotted to the work, and expenditure incurred will ensure great gain to the Province.

CHAPTER XI

INDUSTRIES

General Remarks

In the days of economic internationalism, the object of developing the industries of a country might have been to make the best possible use of its material resources on the principle of international division of labour, but to-day the governing idea is to make it as much self-supporting as possible in its requirements and, where possible, to produce a surplus for the supply of outside demands. This, however, does not mean that international or interprovincial trade should be discouraged or should cease altogether. Even in countries where industries are highly developed these continue to play a dominant part in the business life of the country and shall continue to do so in the future. Absolute self-sufficiency is impossible, nor is it a healthy sign in a people's economic life.

It is, however, admitted on all hands that those countries, where there is an equilibrium between the production of primary goods and of manufactured articles according to a definite plan, are better able to withstand or stave off economic depressions than other countries, and also to bargain with manufacturing competitors in the matter of trade in their unmanufactured articles. In Bengal there is at present hardly any such development with the result that she derives no benefit from the rich stores which nature has bestowed upon her with a lavish hand. Considerations of her vast resources and large population demand that the province of Bengal, though part of a larger unit, should be treated as a country in any wisely planned scheme of economic development.

"The Province", said His Excellency Sir John Anderson in his speech on November 30, 1933, "is not poor either in natural resources or man power, but there must, I feel, be some

maladjustment *somewhere* in a system which keeps "a vast agricultural population groaning under a load of debt, eking out a narrow and penurious existence and yet, in most districts lacking useful occupation for nearly nine months out of the twelve". Bengal's man power is thus being wasted while her raw materials, which could have been transformed into finished goods to meet the requirements and needs of her own people with the aid of this power, are being exported away to be converted into finished or manufactured articles some of them only to return to be sold in the Province at greatly enhanced prices.

It is thus abundantly clear that there can be no equilibrium in the economic condition of the Province without industries other than agricultural. And such equilibrium must be dynamic, the industries shaping according to the requirements of the Province and also of the country.

The industries which Bengal needs develop may be divided into three categories :

- (1) Cottage Industries,
- (2) Small scale Industries,
- (3) Big Industries.

It is desirable at this stage to state clearly what we mean by this division of the industries. The definition of Cottage Industry is easily given. An industry which is carried on by the worker in his own house and mostly with the help of the members of the family is generally known as a Cottage Industry. Almost all the traditional indigenous industries of Bengal and of India are those to be found in the cottages. In the same way the big industries are too well-known to-day to need a definition. The exact lines of demarcation of the small industries from cottage on one side and the big on the other are difficult to draw, but they may be described as those industries whose capital is small, whose proprietors or managers are in direct touch with every stage of production and distribution, whose overhead charges are inconsiderable, for which the raw materials are found and procured locally and which mainly cater for local demands. We shall see as we go on that there is need for all these three classes of industries, advancing hand in hand.

For a successful planning of the industrial development of Bengal it appears necessary that the industries which have a prior claim to be taken up first are those for which the raw materials are to be found within the Province itself and whose products are consumed by her people. Attention next may be directed to the working up of the raw materials which her soil produces in such abundance that she can afford to export them. Jute, hide, oil-seeds, etc. are some of the commodities that come under this category. It goes without saying that it is more profitable to export goods in a finished form rather than unfinished, simply because the manufacturing profit remains within the country and allied industries derive benefit. We next come to the innovations which carry forward a stage or two the produce which is now exported raw and is worked up abroad.

From the problem of handling the raw produce of the Province before export we pass on to a subject of equal importance but of greater complexity, *viz.*, the possibility of substituting local manufactures for foreign goods which the Province imports in large quantities for her own consumption as also for those manufactured out of materials imported from outside. It may be taken for granted that the view-point that the general welfare of the country will be best promoted by any step which tends to diminish the abnormal disproportion in number that now exists between the artisans and the agriculturists, is a true one in the economic interests of the country. The problem before us is how the former can secure fuller employment. It appears that, if necessary, there should be no objection even to the importation of raw materials from outside to find employment for these people.

Assuming that industries are to be introduced in the Province with due rapidity the question that arises is how are the various types of industries, *viz.*, the cottage, the small and the big industries to be distributed, that is to say, what particular industries are to be developed as cottage concerns, which industries are suitable for small scale operation, and where large scale production is to be undertaken. In doing this

it is to be borne in mind that the industries of the country will require necessary protection from an unfair and unjust competition from external sources and above all against dumping. It is also taken for granted that these will enjoy necessary facilities in the matter of freight, insurance and other requirements, if not subsidy, so necessary for the rearing up of industries in nascent stages.

Superficially, the case against cottage industries is one of price. At the same time there is evidence that in articles of long and traditional use in the household quality is by no means "ignored". The strong coarse cotton wrapper of the peasant has never had to succumb to the more attractive long-cloth of the mill and so far from the handloom weaver approaching the fate of the dodo, he is absorbing large consignments of the finer counts of yarn—foreign and indigenous—in his trade. In fact, the Bengal mills have been hard put to supply the handloom industry with the required quantity of this quality of yarn. It is only in rare and special instances that household metal vessels are made and hammered anywhere except in Bengal, though the sheets of which they are made are often imported. And the Bengal brass and bell-metal worker has the reputation of producing his own alloy which in most cases stands the acid test successfully. Nor do the women, rich and poor, look abroad for the ornaments they wear. Past experience shows and from all materials at our disposal we may take it that with anything near equality in price the products of the cottage industry are and will be preferred.

There is the additional consideration in this discrimination that the indigenous artisan is better acquainted with, and is more amenable to, the tastes and requirements of his customers. Still with these advantages the tussle is between manual labour and mechanical power and this brings us on to one of the most widely discussed controversies of the time.

The advantages of the factory system are many. The nature of work seems to be popular when once established; the operatives generally are patient, docile and industrious and their supply is abundant. Power is near at hand and cheap.

There is, moreover, a certain moral influence in disciplined co-operation which cannot be ignored or overlooked. Both work and pay are regular, whether the labour is cheap or not is a question not always answered to the same purpose. Wages keep pace with the standard of living. If the latter is low the former are low also. Further the extension of the factory system has provided employment to the non-agricultural population which, in its absence, would have been placed in an extremely difficult situation. So far the development seems to have been in the right direction, but there is the other side also. Machines have to be imported from outside and the climate makes certain processes in the factory extremely fatiguing. Although indigenous capital is slowly forthcoming, still the preponderating share of the industrial capital in the Province belongs to the non-provincials with the result that the children of the soil get only the wages and rent while profits leave the boundary of the Province. The labour is supplied by the provincial but the harvest is reaped by the non-provincial.

Even in the matter of labour, the Province does not derive the full advantage. The big industries are mostly concentrated in and around the cities. They do not attract the semi-agricultural artisans so much as the landless labourer or the small peasant whose holding is inadequate for the support of his family and who resorts to the factory only between the sowing and harvesting periods—thus utilising the period of enforced unemployment for want of occupation. Further there are social and other considerations to be taken into account and this is manifest in the overwhelmingly large number of workers from other provinces finding employment in the mills and factories of Bengal. To the Bengalee agriculturists, be he a Hindu or a Moslem, for, there is very little difference between the two, the idea of moving out of his village hardly finds favour except under special conditions, often under stress of circumstances. The Bengalee provincial, Hindu or Mahomedan, is a home-loving human being and cannot easily be tempted out of his village home except for very advantageous conditions. Local ties exercise an influence which foreigners are hardly able to

comprehend but the recollections of which will live for all time in George Eliot's delineation of the English rural life of a century ago.

Besides the state of affairs described above there are other limitations to a rapid industrialisation of the Province. True, the tall chimney is a landmark in the industrial development of the country, but its smoke rolls over the city only. To the vast majority of the people of the Province, the hum of its machines bears no message. And the causes are not difficult to find. There is undoubtedly a widening of the educated Bengalee's outlook; but he has to struggle against odds. Indigenous capital in the Province is still shy, at least for large scale undertakings. The provincial has entered the field long after the manufacturers of other countries—even of some of the other provinces—have had a grip of the markets and, therefore, have secured the advantages attendant upon prior entry into the fields of manufacture. He has an abnormally long way to make up before he can hope to enter the list of competitors upon equal terms.

Although we cannot do away with large scale production in many industries, particularly the export industries, it has become abundantly clear that factories shall have to be dissociated to a large extent from the indigenous development of industrial Bengal and for that we must consult the life of the rural people. The Province is preponderatingly an agricultural one. The tastes and requirements of the vast rural masses of Bengal are, therefore, the chief factors for consideration in the industrial development of the Province and it is with reference to this standard that the supply must adjust itself. There is, however, no lack of evidence to show that the standard is expanding both in cost and variety. First comes the question of the future of the traditional and well-established industries which cannot be reorganised upon a brand new system to suit the changed and changing conditions. Hitherto their continuance of strength depended mainly on the consideration which the Bengalee paid to customs and traditions and to his apathy to drastic reforms and innovations. The humble artisan is an

ancient, useful and respected member of the society and is not to be swept away or aside, but he has to be induced to move along with the times. He has already taken a keen interest in new tools and appliances which he often applies to his old and traditional work. The caste system instead of being a handicap may, as Mr. Baines admitted, "provide ready to hand the most admirable raw materials for technical training, dexterity, patience, single-minded devotion to the trade and a continuous succession of apprentices". Speaking at a meeting of the East Indian Association, London, Mr. M. S. Das of Orissa observed that the caste system in which a particular industry was followed in each caste had the remarkable effect of producing physical adaptability among the workers; the son of a silversmith, for instance, showed an extraordinary facility in the beginning of his training in filigree work (carried to perfection in Orissa) in bending a tiny piece of wire into a circular form by a dexterous twist of the left hand thumb, an operation in which a man not inheriting the skill of this work would scarcely succeed even after months of strenuous effort. This rich legacy of the caste system—physical adaptability to particular forms of industry—ought to be regarded as one of India's natural resources as much as her raw materials and its commercial value fully considered and appreciated in any project for the improvement of the industries of the Province.

But to take full advantage of the facilities referred to the training to make him fit for altered condition must be brought to the worker in his home where the whole family can gather round and receive an ineffaceable impression on their minds and intelligence, in short, on their faculties from demonstration which is always more valuable because more enduring in its effect than precepts. Under the present system of technical education in Bengal this can hardly be done efficiently except in the case of weaving education which is being imparted by peripatetic weaving instructors. The Unemployment Relief Scheme drawn up by Mr. N. K. Basu, M.L.C. and subsequently developed by the Department of Industries, sends out trained peripatetic demonstration parties to mofussil centres. This

naturally evokes keen enthusiasm not only amongst Bhadrak youths but also amongst cottage workers. The experiment was also inaugurated in Madras where it cannot be said to have developed as well as it should have done. To Bengal belongs the credit of having made it possible and successful. No wonder, the Directors of Industries from other provinces, as also from some of the progressive Indian States, have considered it useful to come here to study the scheme adopted in Bengal. Speaking generally, however, technical institutions have not yet got into touch with the classes which of all others would derive benefit from their teachings. We do not refer to the Schools of Art which devote themselves chiefly and professedly to the revival or improvement of industries which do not enter into the life of the masses, although it is mainly to them that the Indian industries owed much of the reputation they acquired in the early days of European connection with the East. Even in the institutions meant primarily for artisans, more attention is paid to the manual dexterity than to the development of methods of work and the habit of thinking beyond the bounds of processes actually taught, and the immediate provision of employment, for, the pupil takes precedence, to some extent, over the development of the sense of responsibility imparted by the building up of an independent career.

The rural life of the Province being what it is, it is hardly to be expected that its industrial awakening will be effected by the outward application of direct stimulus. "We ought never to forget" said an Englishman competent to speak on the subject, "that we are not considering the conditions of a half-civilised people eager to catch hold of any practice that they perceive in a European country, but with an ancient and elaborate civilisation, which, by its successful resistance to centuries of foreign political domination, has amply proved how suitable it is to those who possess it, and how deep are its roots in the heart of the people." The very natural impulse of such a system is to look with suspicion upon the methods and proposals of foreigners which may widely differ from their own. Those outside this iron-girt circle who wish to introduce some

modifications can best accomplish their purpose by a process of, as it were, leaving open doors disclosing attractive prospects, or of furnishing the utmost possible number of opportunities for observation and experiment in fresh directions. At some time or other these facilities will surely be utilised. "Wants will increase with the means of satisfying them, and an effective demand is always met half-way by those who are interested in the supply".

In Bengal, as well as in other parts of India, cottage industries can be revived and made to take their rightful place in the industrialisation of the country. It is often said that the moral which many people draw from the history of the development of European manufactures is that if India is to regain her position as a great manufacturing country, it must follow in the footsteps of the European industry, revolutionise the working condition of her traditional handicrafts and turn the village workshops into steam factories and give up hand labour for mechanical power. They start on the assumption that India's salvation depends on her artisans leaving the seclusion of their hearth and home and joining the factories. They take it for granted that processes which have become necessary in Europe must be necessary for India where totally different conditions prevail. If these two assumptions are accepted the prospects for India would indeed be gloomy. No Indian should view with unconcern the prospects of the dawn of congested cities and depopulated rural districts, of unhealthy conditions of work in a trying climate, of ugly struggles between capital and labour which are already manifesting themselves, wherever industries have been started and established, not grown or developed, struggles which have vitiated the relationship of man and man, of uneven distribution of wealth, of social unrest and social evils and all the attendant vice, pains and penalties of the great industrial development in Europe and America.

In a well-ordered scheme for the economic development of the Province there is room for cottage industries—in fact all three classes stated before should develop, one along with and by the side of the other. This has been abundantly made

clear by Japan where the big mills and factories—adapted to suit special conditions, social and climatic, flourish side by side with the humble workshops of her cottage workers turning out not only art products but also indispensable articles.

Before entering into the details of the various cottage industries that still exist in Bengal and also of those which can be revived, it will not be out of place, with a view to prove their potentialities, to make a rapid survey of the cottage industries. Most of these industries are common to all provinces of India, catering as they do for the people, simple and frugal, but with artistic sense highly developed.

India had been famous for her industries long before the Western countries developed them and her manufactures were in a highly flourishing condition. It is a fact that the Mughal Court encouraged large towns and urban enterprise. But long before the Mughals penetrated into the country she was famous for the products of her art industries, unique in their excellence and revealing the finishing touches which only steady practice can give. "European traders were first attracted to India not for her raw products but by her manufactured ware". And these wares were the products of cottage industries carried on in villages to which the trader was attracted by their reputation and demand not only in all parts of the country but in foreign countries also. The old trade routes were in use long before the Europeans contemplated to capture the trade by sea and then followed a period of fierce struggle for supremacy in that trade.

India's hereditary artisans and art workers constituted a vast population and the mere touch of their fingers, trained for hundreds of years to the same manipulations, was sufficient to transform whatever work was undertaken by them "into something rich and strange", and characteristically Indian. No wonder, the nations of the West became enamoured of Indian wares. Pliny lamented the vast shipments of gold and silver sent from Europe to pay for the products of Asia and said, "In no year does India drain our Empire of less than fifty-five millions of sesterces (£438,000) giving back her own wares in

exchange, which are sold at one hundred times their prime cost”.

These cottage industries gave employment to the people of India, and a large portion of the Indian population was engaged in these industries down to the close of the eighteenth century. They made Indian cities populous and rich. The destruction of the most profitable industries and the deterioration of her wonderful arts have resulted in the breaking up of the colonies of workmen who were settled in the large towns. As an example Sir Henry John S. Cotton cited the case of Dacca. “It was during the Moghul Government that this city reached the zenith of its prosperity. When it passed under British administration the population was estimated at two hundred thousand souls. In 1787 the exports of Dacca muslins to England amounted to £300,000 ; in 1817 they had ceased altogether. The arts of spinning and weaving, which for ages afforded employment to a numerous and industrious population, have now become extinct. Families which were formerly in a state of affluence have been reduced to penury ; the majority of the people have been driven to desert the town and betake themselves to the villages for livelihood”.

What has happened to Dacca because of the decay and destruction of the muslin industry in which her inhabitants had specialised has happened to Murshidabad, which became the capital of the Province after Dacca, because of the fate that has overtaken her silk industry. When Clive entered Murshidabad, he wrote of it thus : “This city is as extensive, populous and rich as the city of London, with this difference, that there are individuals in the first possessing infinitely greater property than in the last city”. The silk industry was the principal non-agricultural industry of the district for about three centuries. It was silk which attracted the English East India Company to the district where it had to encounter competition with the French, the Dutch and the Armenians. Though Cossimbazar was the general market for Bengal silk there were other centres of the industry, and Lord Valentia described Jangipur in 1602 as “the greatest silk station of the

East India Company with 600 furnaces and giving employment to 6,000 persons". To-day the town of Murshidabad looks like a vast ruin.

Needless to say that various causes have combined to bring about the decay of these cottage industries, not the least important being the effect of the introduction of superior machinery. No one deprecates the proper functions of machinery in modern civilisation ; but machinery should be the servant and not the master of man.

The indigenous industries of the country present what may appear to be a paradox and which we would do well to examine. They form, in a manner, the foundation of the social and economic system which has successfully withstood the ravages of time. They have borrowed freely from Turanian, Dravidian, Sassanian, Greek, Mongol and European sources, but the assimilative power of the Indians is as remarkable as their creative faculty and in the hands of the hereditary craftsmen everything they produce assumes the distinctive expression of Indian Art. And in every Indian village almost all the traditional handicrafts are still to be found in existence. The march of dynasties contending for political supremacy and all that the supremacy implies has not been able to extinguish these old industries which, thanks to their inherent strength which they acquire from popular taste, still maintain their existence. Sir George Birdwood who has, perhaps, done more to demonstrate the superiority of Indian industrial arts even to those of Europe than any one else, found that these arts still hold their own in the villages. It is thus that he has described an Indian village not far from the mills of Bombay :

"Outside the entrance, on an exposed rise of ground, the hereditary potter sits by his wheel, moulding the swift revolving clay by the natural curves of his hands. At the back of the houses . . . there are two or three looms at work in blue and scarlet and gold, the frames hanging between the acacia trees, the yellow flowers of which drop fast on the webs as they are being woven. In the street the brass and copper-smiths are hammering away at their pots and pans ; and further

down, in the verandah of the rich man's house is the jeweller working rupees and gold mohurs into fairy jewellery, gold and silver earrings and round tires like the moon, bracelets and tablets and nose-rings and tinkling ornaments for the feet, taking his designs from the fruits and flowers around him, or from the traditional forms represented in the paintings and carvings of the great temple which rises over the grove of the mangoes and palms at the end of the street above the lotus-covered village tank".

Thus work in almost all Indian villages the hereditary handicraftsmen for the sake of whose works the whole world has been ceaselessly pouring its bullions for 3,000 years into India, and who for all the marvellous tinsels and embroidery they have wrought, have polluted no rivers, deformed no pleasing prospects, nor poisoned any air. They are themselves an institution as old as the arts they handle and equally important in the economic life of the country.

The innate vitality of the cottage industries only awaits the introduction of improvements and innovations to reappear in their full vigour and splendour.

"The greatest material boon which can be conferred on India," wrote Sir Henry John S. Cotton, "would be the restoration of her industries. The greatest material calamity which can befall India is that which has been going on for so many years before our eyes—the continual contraction of her manufactures". It has been so because hitherto the Indian industries have been systematically neglected by the Indian administrators. They had no faith in the future of small industries, and had, in good faith, always devoted the whole force of the State machinery to the development of the export trade leaving the home industries to take care of themselves, to sink or swim so to say, as they could. They had, moreover, held that small or cottage industries are reminiscent of a time that was long past. The inevitable result was the decay and, in many cases, the destruction of many once flourishing and lucrative industries and valuable arts. It had never occurred to these men, trained as they had been in the tradi-

tions of one of the most industrialised countries, that the existence of great organised armies of skilled handicraftsmen in India pointed to the unwisdom of working exclusively on the lines of Europe's nineteenth century industrial methods in the economic development of India.

"If the village handicrafts of India", wrote Mr. E. B. Havell, "can be developed to a high degree of prosperity by other methods, surely it is nothing less than a crime to allow the villages to be depopulated and to crowd the inhabitants into filthy factories, polluting both earth and air, where all their mental and moral faculties are debased. Should not the social evils caused by industrial development in Europe and America give Indian statesmen pause before they commit themselves to a policy which, if attended by many evils in Europe, would be a far greater curse to India?"

May be the instinctive dislike of the artist for machinery has manifested itself in the extract quoted above, but we perceive that already in Europe there are signs that indicate that before many generations have passed they will come to regard many phases of the last century's industrial development as a hideous social nightmare. When electricity has taken its proper place in the industrial system of the countries and power has been produced from air and water to be harnessed to the service of man, there can hardly be any doubt that many industries will return to the villages and many pestiferous rookeries in the great towns will be cleared off the face of the earth. Why should we regard as the only policy in India that which means the multiplication of such social plague-spots as the big mills and factories generally create? "India is intended both by nature and by the genius of her inhabitants to be a hand-workers' paradise; why should we only employ methods originating in totally different conditions of social economy, and give her an inferno for her paradise?"

We have said before that the cottage industries and arts of the country can still hold their own against machinery in their own sphere. They, like Tennyson's *Sleeping Beauty* now lie "a perfect form in perfect sleep" awaiting the touch

of the Fairy Prince which alone would snap the charm. That Fairy Prince would appear in the shape of improvements and innovations.

What improvements and innovations can do for these industries has been amply demonstrated in the case of the hand-loom industry which, as Sir Atul Chatterjee has pointed out, "has the greatest chance of survival when it adopts the methods of the power industry without actual resort to power machinery". It is well-known that two or three mechanical improvements have enabled about 10,000 weavers in the villages round Serampore to nearly double their earnings, that is instead of an average of 4 or 5 rupees monthly, they now earn from 7 to 9 rupees. That there are serious technical difficulties which prevent the fly-shuttle being used for all classes of weaving, we admit ; but for the great majority of the weavers it would certainly be an enormous advantage. "Supposing that 400,000 weavers were thereby enabled to increase their earnings in the same way as the Serampore weavers have done, it would mean that their total monthly earnings would be increased by 12,000,000 or 16,000,000 rupees or an annual increase of 144,000,000 to 192,000,000 rupees—a sum approximating to two-thirds of the total value of the yearly imports of foreign piece-goods". In writing thus in 1903, the writer added, "When it is further considered that the improvements which have already done so much for the Serampore weavers are the very first of a long series begun in 1733, and that the latest English-loom is five or six times as effective as the old fashioned loom now used at Serampore, it is possible to realise the splendid future which might be opened out for the Indian hand-loom industry."

What has been said above of the hand-loom industry can also be said of various other industries indigenous to Bengal. Experiments and research conducted in the workshop and laboratory of the Bengal Industries Department have produced improved methods of manufacture which promise to quicken the atrophied veins of quite a number of our ancient industries with the life-blood of innovation. It is well-known that to

give effect to the Government's Bhadrak Lok Unemployment Relief Scheme peripatetic demonstration parties are now touring the Province and giving young men necessary training in a number of small industries, not requiring a large capital, nor elaborate machinery—industries which have been more or less completely investigated by the Department, their economics fully studied, and new processes of manufacture evolved and standardised.

We have referred to the wonderful vitality of the cottage industries in the Province as also to their importance in the social and economic structure of the people. It would be foolish and, almost criminal, to overlook their claims to live and to allow them to die. They have a right to live and give sustenance to the people and prevent the possibility of an economic and social revolution overtaking an ancient and civilised people. That they can be made to prosper if only their processes are improved, we have shown. What is necessary is to realise their possibilities and potentialities. They constitute a valuable asset in our national life and should be developed to their full extent. Their development does not stand in the way of the introduction of machinery for necessary purposes nor challenge the change that is inevitable.

The many avenues which still remain unexplored to bring new life into these industries—desponding and drooping through neglect—should be explored systematically. They should be resuscitated and their withered sticks made to bloom forth again into prosperity. Deserted villages should once more be made cheerful by converting them into busy hives of human life and labour. What is wanted for the cottage industries of Bengal is to do what Sir Horace Plunkett and his co-workers succeeded in doing for Irish industries by their efforts to link up the Irish villages with the populous towns. The work should be undertaken at once or the effort may come too late to revive these once prosperous industries which were the pride of the Province and the means of occupation of its teeming millions.

The indigenous workman is not impervious to the influence of innovation and is not deficient in introducing improvements. The alloy used by the bell-metal workers of Khagra (Murshidabad) has been much appreciated by the people. And in 1908 Mr. Cumming in his Review of the Industrial Position and Prospects in Bengal wrote, "In the making of alloys, we have nothing to teach the people, and they are themselves capable of adopting new ideas. For instance, about eight years ago at Bankura, they started making a nickel ware (1 part nickel, $\frac{1}{2}$ or $\frac{3}{8}$ zinc) which has a very fine polish". But the assertion that there is nothing which can be taught is an exaggeration. Already it has been found that the new alloy made by the Department of Industries while it stands the acid test successfully is cheaper than the alloy ordinarily used. The workers should not be left to their own device in their search after new raw materials but should be helped in the work.

Mr. Cumming came to the following conclusion as the result of his enquiries :

"After six months' special investigation, during which I have examined industries in twenty-six districts it appears to me that what is now required is not the teaching of the existing methods in cottage industries, but the teaching of improved methods, and also the assistance of the educated upper middle classes in a more organised system of production and distribution. Mechanical power, or in some cases an improved adoption of human power is required. An acute observer, representing the United States Government, has recently reported to Washington that the Swadeshi movement must recognise that this is the age of machinery all over the world. The artisan must not be left to himself to obtain his raw materials to produce an article, and then sell the completed product".

This improvement must be introduced by the Government with popular co-operation firmly secured.

SURVEY

Before a scheme is fully developed and finally adopted a careful and comprehensive survey of the industries must be

undertaken. In 1883 Mr. T. N. Mukherjee published his *Handbook of Indian Products* (Art manufactures and raw materials) in which was given a short list and description of the art manufactures of Bengal. Mr. Mukherjee had to work under difficulties and the information he could collect, beyond what had been secured by his own efforts, had remained scattered in the books of Roxburgh, Balfour, Hooker, Drury, Royle, and Birdwood.

In 1888 the Government of India issued a resolution on the subject of technical education. For each province an industrial survey was recommended, and Mr. Collin was entrusted with the work in Bengal. His report on the existing Arts and Industries in the Province was prepared at the end of 1890. Strange as it may appear the Report of this first comprehensive survey was never formally published, but was relegated to safe custody in the pigeon-holes of the Secretariat. Mr. Cumming thus referred to this unfortunate treatment accorded to it: "The circle of consultants was an official one, and the result is that the very existence of such a report of which practically all the recommendations still hold good is in danger of being forgotten. Five years after its preparation I was informed when I asked for a copy that it was confidential".

In 1908 when Bengal was divided into two parts, Mr. Cumming was entrusted with the work of investigation in Bengal (*i.e.* Western Bengal and the districts now included in the Province of Bihar and Orissa), while to Mr. J. N. Gupta was given the work of surveying the industries of the short-lived province of Eastern Bengal and Assam. Needless to say that portions of these reports are now useless for Bengal as reconstituted.

Seven years after, in 1915 Mr. Swan's report was published.

A summary of the cottage industries was compiled from the Reports of Messrs. Collin, Cumming, Gupta and Swan in 1916 with a view to enable the officers of the Co-operative Department "to study such industries with the object of intro-

ducing, so far as possible, co-operative methods for their development". This production was reprinted in 1923.

Next year the Department of Industries produced a more comprehensive Report confining themselves to cottage industries only. The second edition of this Report on the Survey of Cottage Industries in Bengal was published in 1929. The original survey had been carried out by five local officers of the Department then located at the headquarters of each of the five divisions. In his preface to the second edition, Mr. A. T. Weston, M.Sc., M.I.C.R., M.I.E. (India), the Director of Industries deplored their having been axed and wrote as follows :

"These officers were denominated Superintendents of Industries, and were retrenched and their posts abolished in the year 1924, since when the Department of Industries has been without any staff, apart from its weaving and technical schools, in the Province and outside Calcutta. In these circumstances, and for the purpose of surveying the position of the widely distributed cottage industries, the department has evoked the aid of the District Officers, District Boards and the Calcutta Corporation. These gentlemen and the staff deputed by them for the purpose have rendered the Department and the public a valuable service in this connection which is gratefully acknowledged".

But the admission must go to show the inherent weakness of the position, as without a staff specially trained for the work the same standard is difficult, if not altogether impossible, to maintain. The survey, moreover, was not undertaken for the distinct purpose of evolving a scheme of improvement in the cottage industries of the Province which form a very important part in the industrial structure and require special attention and peculiar handling to ensure progress.

There is everywhere a welcome recognition of the importance and the proper place of cottage industries in the economic arrangement of the country. And Bengal is no exception. A complete scheme for the reorganisation of cottage industries in Bengal should be immediately drawn up.

An interesting line of development of cottage industries in the Province will consist in having a long chain of trade schools. In every important centre of one or other of the various cottage industries, like textiles, leather, ceramics, etc., such a school or schools should be established. The schools should not only recruit and train the boys engaged in the respective crafts but would also have depots to distribute suitable raw materials, improved patterns and better devices to the workers of the locality. The local schools should be federated into Sub-divisional schools which should ultimately be federated into District Schools to be affiliated to the Central Institute in Calcutta or in the important towns. In the case of leather all the District trade schools may be federated into the Bengal Tanning Institute in Calcutta ; in the case of cotton weaving they may be federated into the Serampur Weaving Institute and in case of silk, into the Berhampore Silk Institute.

These Central Institutes, it is suggested, should have museums attached to them exhibiting the various goods imported into the country in their own lines. The Sub-divisional and village schools should have similar museums but on a much smaller scale. The idea of having museums associated with the schools is to place before the learners an entirely different picture, a picture of what they are ultimately to produce and at what price, so as to create more interest in the training offered. Mere imparting of training without a commercial back-ground often fails to create an atmosphere of seriousness which is found to be so lacking in the outlook of the recipients of training. Our point is that the schools, both central and local, should select a few suitable varieties and concentrate on their production so as to dispense with the imported goods. In the five year plan for economic development which we have been at pains to outline, an attempt to undertake the production of all the multifarious kinds of products that are being imported to-day will hardly be possible within the time limit. The Central schools would secure orders in certain selected lines only, and carry out these orders through the Sub-divisional and village Trade Schools.

Before we take up for consideration the case of the various cottage industries of Bengal with a view to ascertain if they cannot be revived—because efforts in this direction often fail after the movement of decline has passed a certain stage—it would be necessary to remember two important points :

(1) The old indigenous industries of Bengal were almost without exception cottage industries and that,

(2) There are industries which can be conducted as cottage, small scale and big.

One of these industries is the important industry of cotton weaving and we shall presently concern ourselves with it as a cottage industry.

It is but one step from the cottage industry to the small scale industry. In fact, the border line between the two is easily transgressed. But the law has fixed the barrier between them distinguishing the workshop from the factory. In the cottage workman's workshop there is no age limit fixed for the labourer, nor any restriction imposed upon their working hours. When the number of workers employed exceeds twenty the law steps in and enforces regulations.

We have already given our definition of small industries. Hitherto by industries people generally understood only two classes, the big industries and the cottage industries. The small industry is more or less a new sort of organisation necessitated by the imperfect development of the investment habit of the people, their social and economic order, and the high transport and allied charges. And this has been facilitated by the introduction of protection assuring the internal market to the indigenous industries. The principal idea about the establishment of these small industries is to supply the local demand. In particular cases, where the local demand for a particular stuff in the whole Province is small, such industries may be established to supply the requirements of the entire Province. No better illustration of the small industry can be cited than small sugar factories manufacturing gur from sugar. A complete and up-to-date economic sugar mill, using cane as the raw material, requires a large amount of capital.

In the present mood of the capitalists such factories are difficult to be established in the Province. But even if these are established they are sure to displace the cane growers from their secondary occupation, namely converting cane into gur. Instead of finding more employment for the people, which is the pressing need of the day, these mills will throw more people out of employment. On the other hand, small factories, costing not more than 5 to 10 thousand rupees may be established all over the Province to manufacture sugar from gur. Such factories will be within the means of middle class men, either singly or by the combination of a few, and it will keep the cane growers engaged in their subsidiary occupation. The cost of manufacture will not be high because of the absence of overhead charges, and also of the freight both inward and outward. The product may not have the finish of the big factory made stuff, but the masses will not grudge its slightly inferior appearance.

It is perhaps unnecessary to try to develop a thesis on the position and prospects of big industries in the country. Although many of the elementary requirements may be met by cottage and small industries, large scale production is indispensable in these days of rising standard of living, in the case of commodities like steel, chemicals, etc. Really economic units preparing by-products, and thereby economising production, in the case of complicated processes of manufacture, require a large amount of capital and vast organisation if foreign competition, in spite of protection, is to be successfully met. Then comes the question of export industries. Here, cheap production and uniformity of standard are absolutely necessary. Small lots, prepared in small establishments or by cottage industries, cannot have, in the absence of standardisation, that uniformity which is the prime requirement for such business. There are still other cases where the establishment of big industries facilitates the working of small and cottage industries ; for example, in cotton textiles the task of the handloom workers becomes simple if instead of spinning their own yarn they get the yarn from the big factories. There may be

even a jute cottage industry if there be a big factory supplying the yarn. In the absence of standardisation the products of this industry may not, to begin with, find markets outside the country, but there is no reason why it should not be able to supply the internal requirements. Numerous other cases can be cited where the big factory, preparing the raw material up to a certain stage, can foster the growth of smaller—cottage industries.

It is difficult to say as to the extent any planning will be effective in this direction. Foreigners and non-provincials are increasingly turning to this field while indigenous capital, although more of it has been invested now than a few years ago, is still insignificant compared to what the former are putting in, in this line. It is doubtful whether the Government can do anything for the people of the Province in this direction. The salvation lies in their own initiative.

CHAPTER XII

COTTAGE INDUSTRIES

Hand-loom Weaving

The Report on the Survey of Cottage Industries in Bengal makes the following significant statement :

“A careful perusal of the report reveals at once the fact that hand-loom weaving is far and away the most important and valuable and widespread cottage industry of the Province. From no district or centre is it absent, while in some centres such as Santipur in Nadia, Chowmohani in Noakhali, Sonamukhi, Vishnupur and others practically the whole population is absorbed in hand-loom weaving and subsidiary occupations as their principal source of livelihood, but almost always with some stake in the land and agricultural operations as a source of food supply. *Hats* (markets) such as those at Ramkrishnapur in Howrah, Chowmohani in Noakhali, and Madhyakul in Jessore, transact business to the extent of many lakhs of rupees every year both in the supply and sale of mill-made yarn of Indian and foreign origin, as well as in the purchase and sale of finished hand-woven products for local and distant consumption. As far as technique goes the inference to be drawn is that in spite of an addiction to the cheapest primitive tools and implements and methods, the workers have surprising dexterity and artistic ability. It is to this cause and also because of the fact that the Indian public are so traditionally accustomed to particular styles and sources of their clothing, that notwithstanding all the disadvantages under which he labours, the cottage weaver still retains so voluminous a share of the weaving and clothing business of the country”.

In every Province the hand-loom weaving industry is next in importance only to agriculture. In his elaborate *Notes on the Industries of the United Provinces* (1908) Sir Atul

Chatterjee said, "the consumption of machine yarn by hand-loom weavers in the Province amounts roughly to thirty million pounds. If to this be added hand-spun yarn, the quantity of cloth woven by hand-loom in the Province cannot be less than thirty-seven million pounds", i.e., more than one-third the weight of cotton cloth consumed in the Province, maintaining a population of quite a million.

Mr. Johnson of the Cawnpore Muir Mills gave the following comparative costs of weaving a pound of cloth :

Power looms in England	...	14	pies
Power looms in India	...	17	„
Efficient handloom in India	...	21	„

How is it then that, in spite of the high cost of production, the Indian handloom still maintains a vast army of workers? The partiality of the Indian public for particular styles and sources of supply of his clothing cannot be the only or even the chief reason for this apparently strange state of things. The majority of the people must and do buy in the cheap market. There are several factors in favour of the handloom. A Government of India note on *Hand-loom Weaving in India* notices the following favourable factors :

- (1) The hand-weaver's plant represents a small capital and can be kept in use for many years.
- (2) The nature and amount of labour requisite for the great variety of design in the more artistic and elaborate garments preclude machine competition in such articles.
- (3) The strength and durability of the coarser handloom articles recommend them to the cultivator for rough use.
- (4) The hand-weaver has a low standard of subsistence, and has also considerable advantage through the inherited skill in the weaving of the finer articles.

To these distinct advantages may be added others ; and these were thus summed up by Sir Atul Chatterjee :

"It has also to be remembered that the hand-weaver often combines the industry with other occupations—

notably agriculture. Moreover, working at home in the midst of his own family, he is generally willing to, and does, work much longer hours than an operative at a factory does. The women of the family also in the intervals of domestic work afford a great deal of assistance in the difficult preliminary processes between the purchase of the yarn and the actual weaving. If hand-weaving were altogether to disappear only a small proportion of such women would be engaged in any other industrial employment. These circumstances interfere with the operation, in the case of the hand-loom weaver, of the ordinary economic law of wages, and the comparative cost of the hand-loom product is not so disproportionately large as mentioned by Mr. Johnson".

How the operation of the ordinary economic law may be interfered with in the case of the hand-loom industry was demonstrated in Bengal when the agitation against the partition of the Province introduced a new factor in the demand for indigenous articles. The annual accounts of the industry in Bengal from 1892 had been rather discouraging. In the monograph for 1898 it was stated "that large number of weavers have abandoned their looms and have taken to other pursuits" or that the cotton weaving industry was in a decaying condition. In 1899 the industry was stated to be on the decline. In 1901 it was stated that the competition of European piece-goods was lowering the prices of the products of the indigenous industry in the Burdwan and Presidency divisions. But by 1906-07 the industry recovered its position. "In Burdwan district there was an increase in outturn of one-half over that of the previous year. From Bankura there was an export trade. At Bolpur in Birbhum there was considerable manufacture. In Hooghly district the manufactures of Arambagh sub-division rose from 11 lakhs to 14 lakhs. In Howrah the mill outturn decreased and the hand outturn increased. In Midnapur, Ghatal was the centre of weaving. In the 24-Pergunnahs the mill market was dull ; the hand outturn smartened in Basirhat sub-division. In Jessore there was a considerable manufacture

in both coarse and fine cloth ; so also in Khulna. In Nadia coarse cloths, bedsheets and towels were made at Kushtia, Meherpur and Shikarpur. Fine cloths with silk borders were made at Santipur for export". A comparison between this account and the earlier accounts shows what a revolution for the time being took place in the industry by the new factor of an increased local demand. The increase in the local demand which was accentuated by the Swadeshi movement can be maintained specially as hand-loom woven cloth is more lasting than the mill-made cloth.

Coming to Bihar and Orissa, which has been separated from Bengal since Mr. Cumming's survey was concluded, we find almost the same conditions as in the United Provinces. It was only in 1933 that Mr. K. S. Rao, Textile Expert to the Provincial Government appealed to the educated young men to take to the new industries which would, to a great extent, solve the unemployment problem. He mentioned the textile industry in Bihar as offering enormous scope in this respect. There are 160,000 hand-looms in the Province providing a living for nearly 400,000 people. Their annual output of hand-woven cotton cloth is estimated at over four crores of rupees in value and equivalent to one-third of their annual total requirements in clothing. The industry offers splendid opportunities for development. "Hand-weaving in India" asserted Mr. Rao, "instead of succumbing in the face of mill competition, has been making steady progress". This is evidenced by the ever-increasing consumption of mill spun yarn. In the course of the last decade the quantity of yarn devoted to the hand-loom industry has increased by 23 per cent. as compared with the figure for pre-war period and the share of Bihar and Orissa in this increase has been estimated to be over 80 lakhs of rupees in value a year.

Mr. Rao also pointed out that the services of four to five thousand young men would be required for the organisation of the industry in Bihar and Orissa, and thus the increasing pressure of the educated classes on the more favoured fields of employment would be considerably relieved.

It has been proved that given necessary instructions and proper guidance, the Bihar weaver working on his hand-loom can turn out goods to satisfy even the most fastidious people of European countries. The Bihar Government realising the importance of design in handicraft secured the services of capable designers and obtained a set of attractive patterns. These were sent to selling agents who approached the retail dealers and booked orders against these samples. In the meantime, local weavers were trained by the staff of the Department of Industries to use improved methods supplied to them and weave new designs. Thus has been maintained a system of demand and supply, and the goods thus produced are checked at Patna and passed on to foreign agents for whom they are prepared. In order to guarantee genuineness, quality of goods and fastness of dyes, the Department keeps an effective control on the purchase of raw materials and other details through agents or master weavers. Besides twenty selling agents, there are two agents specially appointed to explore the markets for Bihar textiles in Europe, Australia and New Zealand. The endeavours have been successful and a sale of over a lakh of rupees is effected every year in Europe, etc. In 1933, very encouraging reports were received from London as regards the prospects of the sale of cottage industry products such as textile work and picnic baskets, durries and chair seats exhibited in the British Industries Fair in London. Her Majesty the Queen continued to patronise Bihar cottage industries and several orders for art textiles were placed by the leading drapery stores of the United Kingdom and the Continent. In spite of severe trade depression the sale of Bihar *pardahs* in European markets has been maintained. It proves what an efficient organisation run on rational lines can do for village artisans.

In this case the initiative was taken by the Government. Had not this been the case the cottage industries of Bihar and Orissa could never have secured the foreign market referred to above.

The initiative necessary to give a fillip to the industry

was hardly such as to warrant any appreciable attraction or attention. It was only when the Commercial Museum was opened in Calcutta by Lord Carmichael in 1916, that the Government appeared to have somewhat warmed to their task. Lord Carmichael's speech in opening the Museum clearly stressed the necessity of a more intimate relation between the Government and the commercial world. The speech is worth quoting at some length :

“The Government in England takes the position of a regulating agency rather than that of an active partner. In India the Government is looked to to perform duties far wider than those of a regulating agency. Lord Curzon was the first to realise this fully. It was he who evolved the present Commerce and Industry Department Lord Curzon's object was, I take it, to emphasize that there is a community of interest between the Government on the one hand and those who are engaged in developing the resources of the country on the other. Their true interests in the matter are the same—the increase of the wealth of India—and they must work as partners, each doing his own part”.

This intimate connection between Government and the commercial world, of which His Excellency spoke, has been sadly lacking in the country. It was Lord Curzon who had first recognised the necessity of a close communion between the Government and the commercial world. Since that time the Government might have done something to perform the duties which they owe to trade and industry and to consult the views of those engaged in producing the commercial wealth in India, but purely Indian industries had been left even under the new regime to look after themselves, and the results had been disastrous for the Indian artisans. They had to fight a very unequal struggle against organised foreign competition.

Coming to Bombay we find that the hand-loom industry is of great importance in the economy of the Province and next to agriculture it affords daily livelihood to the largest number of persons in the indigenous industries, i.e., about 523,231

(including the Indian States). The Government of Bombay decided in 1927 that a survey should be made of this industry in the Presidency and directed that the whole question required to be examined, specially in the following directions :

- (1) The disabilities under which the hand-weavers labour in regard to their business,
- (2) The assistance that Government could give them to withstand these disabilities,
- (3) The kind of cloth they should turn out which would have an easy sale and could withstand the competition of mills and factories,
- (4) The lines on which hand-weaving could successfully be encouraged as a subsidiary industry for agriculturists.

It was found that in no fewer than 990 centres in the Presidency (excluding Sind, the Indian States and Agencies) 2 to 5 thousand or more hand-loom were at work ; and though the hand-loom weaver has to ply his shuttle under the shadow of big centres like Ahmedabad, Surat, Broach, Bombay and Sholapur, the increasing consumption of mill spun yarn by the hand-loom proves that the industry is living a healthy life which is capable of yet further progress under proper management and guidance through the aid of Government.

Three-fourths of the population of hand-loom weavers were found to be in debt either to merchants or to hand-loom *karkhanadars* who supply them with yarn and silk on credit at high rates, and extract in return the finished articles of the looms at great profit. The Report of the survey pointed out that the prospects of the hand-loom weavers would certainly improve if they could carry on their trade independent of middlemen either in respect of the raw materials and tools or of selling facilities. The extreme conservativeness and illiteracy of the weaver were held to be partially responsible for their being slow to adopt modern methods and improved appliances. But their poverty must be regarded as the chief factor, while want of guidance places beyond their conception the benefit that can be derived from co-operative organisations

especially in freeing themselves from the trammels of the merchants who exploit their ignorance and take advantage of their poverty.

At present the weavers produce the same varieties of cloth as their ancestors did a hundred years ago, and the Report suggested that they should be encouraged to produce the kinds of goods for which no competition from mills and factories exists.

The Report mentions the various classes of fabrics which the hand-loom weaver can produce without fear of competition, and discusses in detail the scope for employing hand-loom weaving as a subsidiary occupation for agriculturists. An agriculturist, it is pointed out, can, after about six months' practice on a fly shuttle loom, weave five or six yards of cloth and earn six to eight annas a day of eight hours work. The greatest disadvantage the hand-loom weavers have to encounter is that they do not easily get their requirements of raw materials such as yarn, etc. at a cheap rate. They have to sell elsewhere the surplus cloth woven for want of proper marketing facilities.

In Bombay there were no fly-shuttle looms in 1910 when the Government took steps to introduce them by means of weaving schools and weaving demonstrations. Since then the number of such looms has been on the increase, and fly-shuttle looms and dobbies, etc. are manufactured locally by carpenters at some centres. This shows that given proper guidance the weaver readily takes to improved methods and appliances.

The Government of Bombay have established a central hand-weaving institute at Poona, while in Sind, there are two special weaving schools and a dyeing demonstration.

An idea of the important position held in Madras by the hand-loom industry can be had from the Press Communique issued by the Madras Government in 1932, embodying their recommendations to the Tariff Board then conducting the Second Cotton Textile Enquiry. Although the industry occupies a far lower position (to-day) than it did a century ago, still it provides employment for a population second only to that engaged in agriculture in the Presidency. According to

the Census of 1911, the total population supported by the industry (cotton spinning, sizing and weaving) was 1,118,628 but fell in 1921 to 687,083 (or 911,901 if "weavers unspecified" are included). The recent census figures indicate an increase in the number of actual weavers in the last ten years, from 304,000 to 486,248 (about 60 per cent.). But it is debatable how far these figures are accurate, since the same census gives the number of looms as only 193,474 (including looms used for artificial silk). This is an increase of only 15 per cent. over the 1921 figure of 169,451. On the other hand a survey of cottage industries made in 1928 gave an estimate of 259,451 looms in that year. The *communiqué* rightly points out that in view of the decrease between 1911 and 1921 and the known difficulties under which the hand-loom weaving industry has been labouring in recent years, it is hard to believe that there has been an increase in the number of persons employed much in excess of the proportion in which the general population has expanded during the same period.

The enquiries made by the Madras Government went to show that the hand-loom in the last generation had not succeeded in establishing its position in any of the various lines on which the cotton industry is conducted and that it was in evident danger of being displaced still further by mill competition. The Madras Government were of opinion that such a prospect cannot be regarded with equanimity in view of the immense importance of preserving this ancient handicraft as a source of employment for the larger part of the rural population, and of the undesirability of permitting the production of cotton cloth to become entirely a factory industry, with its concomitants of social maladjustment and deterioration in public health.

The Madras Government believed that the industry was potentially solvent, the lack of progress being due to a variety of causes, chief of which were internal defects from which the industry suffered. Want of steadiness, thrift and industry in the character of the weavers, their chronic indebtedness, their primitive appliances and their complete lack of organisation

were the main defects. But most of these could be remedied, to some extent, by means within the disposal of the Government. Besides these, there were external handicaps in the shape of the duty on yarn and the preferential position of the mills. The Madras Government examined numerous suggestions for improvement and concluded that unless some restrictions were placed on the power of the mills to raise yarn prices against the hand-loom weavers, (within the wide margin allowed by the existing tariff), or unless some arrangement could be entered into with regard to the respective spheres of the hand-loom and the mills, it was exceedingly doubtful whether any internal reform of the hand-loom industry could succeed even in arresting the gradual decay. It was perfectly realised by the Madras Government that money was the most important thing. The enthusiasm of the Department of Industries and the pious wishes of the Government as a whole, no matter how great and sustained, could achieve but little without adequate financial provisions. They strongly emphasized the necessity of having a fund at the disposal of the organising body in order to achieve the improved organisation in apparatus, marketing and finance which the industry urgently required. Such a fund as had been frequently suggested, might be found by the levy of an excise duty or cess on yarn consumed by mills. Admittedly the practical and legislative difficulties are very great. But the important part which the hand-loom industry can play in the proper constitution of the textile industry, can be invoked in justification of such a levy, and has indeed been admitted in the statement made to the Fiscal Commission by the Bombay Millowners' Association. The mills will be benefited by tariffs whose effect, it appears, is mainly detrimental to the hand-loom. "A large articulate interest benefits at the expense of a larger but inarticulate community". Legislation which permits such results needs revision ; but to meet the objection and that such a cess or duty should not fall solely on one section of the industry (a section which, moreover, derives no direct benefit from it), the Madras Government proposed that the hand-loom

industry when organised should also pay the cess which may be put as two pies a lb. of yarn consumed.

We need not discuss the proposal made by the Government of Madras. But one cannot but agree with the opinion expressed that the industry must be saved from decay and eventual extinction due to unequal competition. The claims of the hand-loom weavers cannot be ignored.

We have already quoted from the Report on the Survey of Cottage Industries in Bengal to show the importance of the hand-loom industry in the Province. The latest census report after mentioning the jute textile industry remarks :

“The cotton industry is the only other textile industry of importance in Bengal. It offered employment to 172,798 persons as well as subsidiary occupation to 19,791 persons, but, in spite of a continuously prosperous decade, the numbers were less than at the Census of 1921 when they amounted to 225,333. Cotton spinning, sizing and weaving are mainly found in the Dacca and Burdwan Divisions. Cotton ginning, cleaning and pressing, on the other hand employ now 5,263 persons compared with 1,609 in 1921 and of these the great majority are found in the Presidency Division and particularly in the district of 24-Pergunnahs”.

While admitting that “cotton weaving is perhaps the most universal home industry” the Census Report puts it under the head—“Decaying Industries” on which comments are superfluous. And yet the Bengal hand-loom cotton industry was perhaps the best known in the world at one time.

That Bengal excelled in the production of cotton fabrics and specialised in fine products is well known. And Indian cotton fabrics when talked of recall the glories of Dacca muslins which are now almost a thing of the past. As it is now of historic interest and reminiscent of an age, which is gone, we will only make a brief reference to it here merely to show the skill of the Bengalee hand-loom weavers. In his excellent *Hand-book of Indian Products* published in 1883 Mr. T. N. Mukherjee paid a glowing tribute to the inventive faculty, the perception

of beauty and the high intellectuality of the Indian people which were nowhere better illustrated than in the manufacture of the various kinds of cotton, silk and woollen fabrics for which India had been justly famous from pre-historic times. Among the cotton manufactures, the fabrics known as the Dacca muslins were held in high repute from very ancient times, and in the glorious days of the Roman Empire, large quantities of it were annually exported to Western Europe by way of Egypt and Asia Minor. Later on, high demand for muslins in the harem of the Khalifa of Bagdad gave a great impetus to its manufacture. The muslins of the finest kind were known by the names of "Arawan", or the "Running water" and "Sabnam" or the "Evening Dew". Their texture was so delicate that, as their name implies, they were indistinguishable from pure water when wet. "Three hundred years ago", wrote Mr. Mukherjee, "a piece of Arawan, fifteen feet by three feet, could be made so fine as to weigh only 900 grains, but now a cloth of the same dimensions cannot be made without doubling the weight. The Arawan and Sabnam of the present times occupy the second and the third place among the Dacca muslins in point of quality, the foremost place being given to the fabrics known as the 'Shangati' meaning 'Presentation' and 'Sharbati' or 'Cold Drink' and 'Malmal Khas' or the 'King's Muslin'. A piece of finest quality, measuring 20 yds. long by 1 yd. wide, can be made to pass through a finger ring; it cannot be made in less than six months, and its value will be Rs. 300 or £25. A turban consisting of 30 yds. of such a muslin placed within a cocoanut shell not bigger than an ostrich egg was, according to Tavernier, presented to the King of Persia by his ambassador in India on his return home. In delicacy of texture, in fineness of web, the Dacca muslins have not as yet been surpassed by the highest qualities of the machine made manufactures of Europe."

Yet another place in Bengal was noted for its muslins—Santipur in the district of Nadia. Formerly the East India Company had a large factory in this place, and a considerable quantity of cotton fabrics was annually manufactured here for

export to Europe. The weavers of the present day retain the skill of their predecessors but confine themselves to weaving only fine cloths for ladies and gentlemen of cultured taste."

When the famous traveller Bernier (seventeenth century A.D.) visited India, he was amazed at the vast quantity of cotton cloths, of every sort, fine and coarse, white and coloured, which the Hollanders alone exported from Bengal to different places, specially to Japan and Europe. The English, the Portuguese and the native merchants also dealt very largely in these articles.

That Bengal produced more fabrics than she could consume is evident from her export trade in them. And it is needless to say that all the fabrics mentioned above were produced on the hand-loom. The export trade fell and she began to import cotton fabrics from foreign countries and then from the other provinces of India also! The history of the decay of her flourishing cotton industry has been written by various writers and need not be repeated here. What we are concerned with is a scheme to revive this once-famous industry which is far from dead. Mr. Havell, then Principal of the Government School of Arts, Calcutta, took up the matter in 1901. And, as Mr. Cumming pointed out in his Report, "from that time by lectures, letters and advertisements" he did "a great public service in his efforts to extend the use of the Serampur fly-shuttle loom".

Invited to prove that there is money in hand-loom Mr. Havell came forward to place before the public facts which he thought could not be disputed :

(1) There are in Bengal (in Bengal, Bihar and Orissa) at the present time about 400,000 weavers earning a living in hand-loom weaving. The great majority of them use the primitive apparatus used in Europe 150 years ago. Yet they have so far survived the competition of the best automatic machinery of Europe. With the exception of a fraction of no commercial importance, this hand-loom industry is engaged in producing common cotton cloths from the lowest counts up to the 80 with or without simple cotton borders *which are precisely*

the cloths which can be produced by the latest European hand-loom with the greatest amount of profit.

(2) About sixty or seventy years ago some Europeans at Serampore introduced a few of the improvements in hand-weaving apparatus then known. These improvements were adopted by the local weavers, and since then have gradually spread to the surrounding districts so that now there are about 10,000 using them. These weavers have doubled their earnings, and according to the testimony of district officials and others acquainted with them are in an unusually prosperous condition.

(3) Since the time when these improvements were introduced into Serampore, European hand-weaving apparatus has been so improved that in Roumania girls working on the latest English hand-loom have produced an average daily outturn of 24 yards of cloth per loom (60 threads to the inch) the day being reckoned at ten hours. This is about six times the outturn of the ordinary Bengal loom and three times that of the improved European loom used at Serampore.

(4) The experience gained by Roumania has been now supplemented by corresponding experiments with the same looms in the Andamans convict establishment. These have shown that the latest English hand-loom can be used almost as successfully with ordinary Indian unskilled labour. The same has been proved in a very successful hand-factory at Cairo with unskilled Arab labour.

(5) The ordinary Bengal hand-woven cloth, though it costs much more than the cloth of the same texture produced by power-looms is still so much appreciated that it gives employment to about 400,000 weavers. The power-loom cloth only keeps its place in the market by reason of its comparative cheapness. If the hand-loom cloth can be produced as cheap as or cheaper than the power-loom substitutes the greater part of the money spent on cloth imported from beyond the borders of Bengal—foreign or Indian—would go into the pockets of hand-loom workers in the Province. It may even be said that

a part, at least, of the great export trade in textiles which Bengal formerly possessed, as evidenced by the testimony of Bernier, Ralph Fitch and others, might be recovered. The whole argument about the inevitable supremacy of the power-looms over hand-looms is based on the fallacious assumption that the hand-weaving apparatus has reached the highest point of possible improvement, while automatic machinery is constantly progressing. The fact is that the improvements in hand apparatus have advanced *pari passu* with those of the power-loom and will certainly continue to do so. What, therefore, is necessary is to introduce improvements in the hand-loom and adopt improvements made in other countries not only in labour-saving devices but also in other directions.

The two looms now used in Bengal are very antiquated—the old loom has been in existence probably for the last 3,000 years and the fly-shuttle for about 180 years. During this time enormous developments have taken place in the hand-looms in various countries, resulting in the modern English hand-loom—a machine which works about four times as fast as the Indian fly-shuttle loom and almost as rapidly as the power loom. It must be understood that the modern hand-loom is practically the same machine as the modern power-loom built on the same foundation and doing precisely the same work, the driving power and some of the attachments merely being different. Now, all these improvements we can profit by. They are, after all, simple, some of them may be applied to our existing looms and practically all of them adopted in new looms constructed in the country at a small cost. It must not be forgotten that compared to the outlay on a power-loom the cost of a hand-loom is far less, almost insignificant. Besides the loom, the prospects of improvement in the preparation of yarn, which forms a considerable portion of this industry, are also extensive. Our systems of warping, sizing and beaming are extremely slow and laborious and these processes have been greatly developed in European countries. These operations are the same in principle and do precisely the same work.

What is wanting, then, is the will and the organisation to induce the users of hand-loom to utilise these improvements.

Reference has been made to the use of the improved loom in the Andamans convict settlement. One Mr. Coombes had made the assertion that the foot power or "Domestic" loom was altogether unsuited to India. Controverting this statement Sir Richard Temple, formerly Chief Commissioner of the Andamans wrote thus to the *Textile Mercury* :

"I introduced these looms with great success in the great penal settlement of Port Blair, all worked by Indian female convicts. They were an enormous improvement on the hand-looms in use and had the following advantages :

"They produced a cloth, uniform in quality, coarse or fine ; the 'lengths' produced were constant ; the task of each woman could be accurately gauged and fixed according to her strength. All this was very difficult before they were introduced, as with hand-looms the quality of the weaving depends on individual skill and the cloth produced in a factory varies, therefore, in quality with each weaver employed. A sharp weaver, too, with a hand-loom can much too easily 'fake' the lengths in a way not easy of detection during the weaving by not beating up sufficiently. The quality of the cloth is thus spoilt, but the task fixed in lengths in a given time is eased. Our experience of a factory conducted on a scale, probably not tried elsewhere—the women weave annually all the clothing required for over 10,000 convicts—was that one woman on a 'Domestic' loom could weave as much cloth, at least, in a given time as three women on hand-looms, and that too of an incomparably superior and uniform quality. We found, also, that the women took very readily to the new loom. There were difficulties, of course, on first introduction, but these did not last long. The chief difficulty in the general introduction of the 'Domestic' loom lies in the warp which has to be good and of uniform quality, such

as the Indian hand-weaver does not usually produce ; but this bad habit of his also spoils the hand-woven cloths he produces. We found special machinery necessary for producing a warp good enough for the 'Domestic' loom but that was quite cheap and can be supplied by the same firms that supply the looms. Indeed, so favourably was I impressed with the experiment with the 'Domestic' looms, that I reported strongly in its favour to the Government of India, and had I remained in India I should have taken up the 'Domestic' loom as a machine likely to be of general use in the country for home industries".

Comments on the opinion here expressed are superfluous. Only it has to be pointed out that these looms were worked by females at Port Blair. In Bengal, as a rule, women do not work the looms, the labour being considered to be too exacting for them. It seems, therefore, that these "Domestic" looms are easier to work than the ordinary hand-loom in use in Bengal. This is a decided advantage which should not be overlooked.

A revival of hand-weaving in Ireland was accomplished through the efforts of Mr. William Walker, the Chairman of the Congested Districts Board, aided by a few simple improvements in the hand-looms in use.

We find that with the most primitive system of manufacture the hand-loom in Bengal after about 200 years of severe competition, still retains a large portion of the trade. It is, therefore, obvious that if properly developed, it will be able to gain considerable ground in the future which may enable it to compete with the power-loom. It may, of course, be said that this would be the prospect if no counter advance were kept up by the power industry. But even conceding that important inventions may come, it must not be forgotten that it would not be difficult to apply them to the hand-loom as both the hand-loom and the power-loom are worked on the same principle. It would only be a matter of adjustment.

Thus, on the one hand, we see that the field for improvement in this industry is extensive and, owing to the small outlay required in it, possible ; on the other hand we find that it has been declining because its systems and methods are far too slow and laborious compared to those of the power industry, but that it is still possessed of vitality owing to the inherent superiority of its product. We, therefore, infer that the industry can be developed and, being developed, would be able to compete with its rivals for a considerable period yet. It may also be urged that on grounds of humanity and for the welfare of the masses, hand-loom weaving should be developed in Bengal. The average agricultural worker in the Province is not fully occupied throughout the twelve months of the year. The question of finding supplementary occupations for him which would be suited to his condition and, at the same time, give him an adequate subsidiary income has been engaging the attention of those interested in the welfare of the masses. Bengal affords special facilities for the development of the hand-loom weaving industry, because :

(1) Bengal still depends largely on outside supply for the cloth required by her people and the number of cotton mills in Bengal is comparatively small

(2) The climatic conditions of the Province are better suited to the requirements of the industry than those of most of the other provinces of India

(3) The poverty of the agriculturist is a growing menace in Bengal and must be alleviated

(4) Bengal possesses a vast army of men whose ancestors had been weavers.

We have found that though the hand-loom weaving industry is capable of holding its own against the competition of the mills, yet it is declining. The main reason for such a steady decline is due to the numerous drawbacks not only in the existing arrangement by which a weaver gets his supply of yarn from the market but also in the form in which it is sold to him. As a rule the weaver purchases his yarn in bundle-

form ; this again is in the form of straight-reeled yarn and not cross-reeled as it really should be.

The troubles and difficulties associated with the use of yarn when purchased in the form of 'hanks' are many and varied ; for instance

(a) A lot of time is wasted in winding, to say nothing of the monotony and the extreme tediousness of the process, because of the clumsy form in which the yarn reaches the hand-loom weavers. A large amount of wastage is also caused in the unwinding process ;

(b) In order to obtain the bare minimum production, the sale proceeds of which will be just sufficient for the sustenance of a weaver's family, it is necessary for its members including the weaver himself to devote all the time available at their disposal in the actual weaving process—most of which (available time) is now wasted in preparing the yarn and weft and thus putting a premium on even the minimum production. This, therefore, reduces the possibility of more looms being operated in one family thus considerably restricting the total output of cloth at the end of the month ;

(c) Apart from the process of dealing with the above type of yarn which confines them to make only short lengths of warps for their looms, it often leads to many faults in the actual weaving of the cloth ;

(d) These difficulties and inconveniences as a result of using yarn in the form of 'hanks', are not conducive to the best results of weaving ; the net result is decreased output of cloth per family of weavers as well as inefficiency in the process of weaving.

The measures required to help the industry and guide it on proper lines would be :

(1) To find by experiment (a) the most suitable and efficient hand-loom with a view to obtain increased production and (b) necessary preparatory machines which should be simple in mechanism and low in capital expenditure so as to feed a number of weavers of a particular locality, thus removing not

only the drudgery of labour but also other concomitant disadvantages associated with the preparatory stages of weaving, the removal of which will ensure increased production and better quality.

(2) To overcome the difficulty experienced by the weaver in the matter of preparatory stages of weaving, viz. preparation of warp and weft we would suggest the establishment in each area of hand-loom weavers a small plant consisting of :

- One Grey winder
- One Coloured winder
- Two Grey Pirn winders
- Two Coloured Pirn winders
- One Grey warping machine
- One Coloured warping machine
- One Slasher sizing machine

This plant, if it is installed in an area or near about an area where about 700--800 looms are working, will be able to keep these weavers fully supplied with proper warps and wefts for use in the looms ; further advantage will follow if this plant is located near about a cotton mill so as to facilitate the purchase of different kinds of yarn wound on bobbins which can be returned to the authorities of the cotton mill for a further supply and so on. The benefits of the installation of such a plant would be manifold :

Firstly, due to the supply of yarn in the form of a bobbin a good deal of saving can be effected in the wastage of yarn which is inevitable when such yarn is purchased in the form of 'hanks'.

Secondly, the members of the family who would otherwise be engaged in the laborious process of the preparation of warp and weft would be free to work extra number of looms in their home, thus increasing the output of cloth per family.

Thirdly, the supply of ready sized beams would serve as a great incentive to work more looms in the same family due to the drudgery of labour being removed.

Fourthly, a supply of warp and weft from such a plant as

has been described above would enable them to obtain longer lengths of yarn for their looms.

Fifthly, the warp and weft being delivered in a condition ready to be used by the weavers the output of cloth per family would enormously increase due to the fact that all the available time of the weaver as well as that of his dependents will be fully utilised in operating looms.

The supply of ready sized beams is an absolute necessity for rejuvenating the hand-loom industry of the Province. With the facility of a supply of ready sized beams the hand-loom weavers will be able to produce a far better type of cloth at a lower cost than what they actually produce now, and thus they will be in a formidable position to compete with the average quality of the Indian mill made cloth.

Once these weavers are spared the trouble of dealing with the yarn in 'hank' form their greatest handicap will be removed. We can realise the immense labour that this process involves when we see that the cost of unwinding cross-reeled 'hanks' in cotton mills even with the help of machines is 9 pies to 1 anna per lb. of yarn whereas in bobbin form it costs only three pies or less per lb.; in the case of straight-reeled hanks difficulty is experienced even to get a willing labourer to do the job of unwinding.

(3) In order to introduce such a plant in an area where a number of weavers actually work it is necessary to form a co-operative society amongst them. The formation of such a society will enable them to procure the necessary finance for the purchase and installation of such a plant, as also for purchase of yarn in bulk quantities and disposal of finished products.

(4) To stress the necessity for supplying new and improved designs to the weavers the artistic side is by no means unimportant and the hand-loom can easily adopt designs which the mills find it difficult to work out.

(5) To establish suitable depots in weaving areas for stocking yarns of different counts such as are in demand in

the particular areas. These depots may be attached to the local trading schools.

(6) To multiply the number of existing demonstration stations and peripatetic demonstration parties.

(7) To provide facilities for manual training in weaving in all elementary schools in localities where the weaving community forms the bulk of the population.

We can almost say, in the words of Sir Alfred Chatterton, the great authority on Indian industries, that the "hand-loom weaver, who has already achieved wonders in this age of machinery by means of the primitive appliances of his forefathers, would be able to turn the table on the power-loom weaver, if but a fraction of the capital, energy and organisation were devoted to his trade that have been expended in pushing power-loom weaving".

The three things necessary are

Capital,

Organisation, and

Energy.

For the supply of capital must be recommended the formation of village weavers' societies as credit societies to finance the weavers and to enable them to clear their prior debts, etc., and the inauguration of weavers' stores for financing trade and conducting business. The stores would purchase raw materials for the weavers, standardize the patterns and deal wholesale. The relation between the village societies and the weavers would be that of the contractor and his workmen, the former supplying the capital and undertaking the main responsibility and the latter supplying the labour, until he too earns or finds sufficient capital to enter into partnership and share in the entire profits. The ultimate aim of such an organisation is the establishment of federation of village societies, each controlling its own affairs and enjoying the profits of the trade.

Regarding organisation the formation of chain stores will be found most convenient. The village societies would come under the Union Board Stores which, in their turn, would be affiliated as feeders to and dependent on Sub-division Stores

working under the District Stores. These District Stores would be under the Provincial Depot, which would help them in the disposal of their products both in the Province and outside, including foreign countries by arrangement with big stores and by the appointment of agents of its own.

This Central Depot may also open a museum and undertake advertising and also assist the Stores in keeping them in touch with the markets outside for raw materials and also for finished goods. The supply of raw materials also may be helped by it. It should be in constant and close touch with the Serampur Weaving Institute to be renamed—the Provincial Textile Institute for—

(1) the investigation of general questions affecting the hand-loom weaving industry in the Province as a whole and of special questions connected with it. Here practical experiments should be conducted in a demonstration factory which is also under construction with a view to the discovery of methods suitable to local conditions. Besides demonstrating the working of all improved appliances, designs and methods of work, the factory should serve as a place for providing practical instruction for students and for training teachers and designers, as also *mistries* to undertake repair works. Also for

(2) engaging the services of artists for the supply of new patterns of borders and body of the cloth and distributing them through the Central Stores, i.e. the Provincial Depot which will work in conjunction with the Institute for the benefit of the hand-loom weavers.

The energy necessary must not only come from the Government but also from the educated classes of Bengal and should be transmitted through the amplifier of necessity to the weaving population of the Province trained in the traditions of the industry and only waiting for opportunities to develop their skill.

Silk Industry

The story of the silk industry is the story almost of a great part of the world for over two thousand years. It has

reference not only to the development of arts and in the evolution of the dress of society in many countries, but to the part it has played in the growth of civilisation. It is the story of the rise and fall of communities, ports and avenues of trade, of cross-continental journeys by pack-animals and cross-sea journey by dhows, galleons, and *Indiamen* as well as modern steel vessels ; of a variety of eras and countries such as few or any object of trade can boast.

Silk has been known and manufactured in India for over 3,000 years. It is mentioned in the laws of Manu and even in the *Ramayana* and *Mahabharata*, the age of neither of which has yet been ascertained with any definiteness. Silken vestments were presented to Sita. The profusion of silks which Julius Cæsar was wont to display in the magnificent theatrical spectacles with which he used to entertain the people of Rome were imported from China and India and the great caravans that brought oriental commodities westward went by Khotan across the Himalayas to Kashmir, Gandhara and Kabul ; or by Kashgar and Yarkand, and thence to Sogdiana and Bactria. The great importance of the silk industry may be gauged by a few facts. Palmyra attained an eminent degree of splendour by becoming the clearing house for the silk brought from China and India on its way to Syria to be dyed. When the overland trade routes were changed on account of the cheapness and convenience of the water route Alexandria usurped the prominence and wealth of Palmyra by becoming the centre of silk distribution. Referring to silk, Pliny wrote, "At the very lowest computation India, Seres and the Arabian Peninsula drain from our Empire yearly one hundred million of sesterces, so dearly do we pay for our luxury and our women".

In India itself, as Sir George Birdwood recalled, the industry tended to the development of some of the glorious arts which now, unhappily, only live in memory. "Its marvellously woven tissues and sumptuously wrought apparel have been the immemorial glories of India. India was probably the first of all countries that perfected weaving and the art of its gold brocades, and filmy muslins, 'comely as the curtains of

Solomon' is even older than the code of Manu". Throughout the ages Indian silks continued to retain their hold upon the West. Venice owed its glories to its commerce with the East, and England was supplied with Indian fabrics of price by an annual ship from Venice, "of great *burthen* and immense value" which the Venetians sold at what prices they pleased. It was Indian silks that the early merchant adventurers of the East India Company largely sought and to them the worth of Bengal silks was familiar. Their early letters are full of urgings to develop the trade in silk.

Bernier gave the following description of silks in Bengal :—

"There is in Bengal such a quantity of cotton and silks that the kingdom may be called the common storehouse for those two kinds of merchandise; not of Hindusthan or the Empire of the Great Mogul only, but of all the neighbouring Kingdoms, and even of Europe The silks are not certainly so fine as those of Persia, Syria, Sayd and Barut, but they are of a much lower price : and I know from indisputable authority that, if they are well selected and wrought with care, they might be manufactured into most beautiful stuffs. The Dutch have sometimes seven or eight hundred natives employed in their silk factory at Kassembazar, where, in like manner, the English and other merchants employ a proportionate number."

The East India Company founded its factory at Cossimbazar some five or six miles south of Murshidabad in 1658. In 1670 a factor "well skilled in silk" was sent out from England and in 1681 out of £230,000 sent out by the Company as "investment" for Bengal, £140,000 was assigned to this silk agency at Cossimbazar. In 1776 Bengal silk was said to have driven all competitors except Italian and China silks out of the market.

Lord Valentia who visited the place in 1802 has left a detailed description of the importance of silk in the trade of the Province. He wrote as follows :—

"This place (Jungepore near Murshidabad) is the greatest station for silk in possession of the India Company, although, nominally, Cossimbazar takes the lead ; the others are Maldah, Bauleah, Commercolly, Rudnagore, and Rungpore. The first

attempt to establish a silk manufactory was at Budge-Budge, which did not succeed. The buildings here were erected in the year 1773. They employ about three thousand people; six hundred furnaces have each a man, who spins the silk from the cocoon, and a boy who turns the wheel; the latter in time succeeds the former as vacancies occur. The wages are, for spinners four rupees and a half per month, and three rupees for the boys. The Superintendents have five rupees, and get a few annas out of the wages of the workmen under them. The rest of three thousand are wood-cutters, watermen, etc., whose wages vary. They use the Italian method of spinning, which was introduced about forty years ago, by some natives of that country sent over by the Company for that purpose. *The silk is twisted, which was not the case in the native manufactures.* The untwisted one is worth less than the Italian by two rupees a seer. The India Company manufacture none of this, but purchase a considerable quantity to send home. It is used for articles where silk is mixed with cotton, with which it blends better for its flatness. They have three kinds of silk worm in the country; first, the animal which comes from Tippera, is by far the longest and the best, but gives only one crop; second, the one commonly reared, which is supposed to be indigenous, and is called the Dacey, this produces eight harvests; third, the worst, the China or Madrassy, which also yields eight times a year. These kinds are bred by the women and children. The worms are private property, and the cocoons are purchased by the East India Company. The mulberry tree is the oriental, dwarfish, and the leaves but indifferent to which is attributed a degeneracy in the breeds that have been introduced from foreign countries. The China mulberry has been tried, but it did not succeed from the dryness of the soil. Three different kinds of silk are prepared; the first is made from the annual cocoon; the second from the Dacey and Madrassy, and consists of from twelve to fourteen threads; the third also from the Dacey and Madrassy, and consists of sixteen, eighteen, twenty and as many as twenty-four threads. . . . There are numerous other stations where the natives cultivate the silk-worm and

even have adopted the Italian method of spinning The people looked healthy, and I understand it is by no means a deleterious employment, and certainly in many respects is advantageous, as very young children can be employed, and the eight crops of the common cocoon enable them to earn sufficient to maintain them the whole year”.

The points in this statement which should be noted specially are :

- (1) The silk worms were bred by women and children ;
- (2) Even young children could be employed in the industry ;
- (3) The employment was not deleterious ;
- (4) The cocoon rearing industry enabled the people to earn sufficient to maintain them during the whole year.

Thus this industry was a great economic asset to the people and provided occupation even for women and children.

Another point which should be noted is that as early as the third quarter of the eighteenth century the Italian method of spinning which was a decided improvement on the indigenous, had been adopted.

The value of the silk trade in the district of Murshidabad may be realised from the fact that in the time of Ali Vardi Khan, raw silk to the value of 87½ lakhs was annually entered in the Custom House books of Murshidabad. “This is exclusive of the European investments, which were not entered there, as being either duty-free or paying duty at Hooghly. As regards the European investments, we find that in 1763 out of a total of 40 lakhs required as ‘advances for investment’ the Cossimbazar *aurangs* for filatures demanded 9 lakhs or as much as any other two agencies excepting Calcutta itself.”

Colonel Rennell (1779) wrote as follows :—

“Cossimbazar is the general market of Bengal silk, and a great quantity of silk and cotton stuffs are manufactured here, which are circulated throughout great part of Asia ; of the unwrought silk, 300,000 to 400,000 lbs. weight is consumed in the European manufactories.” The filatures and machinery of

the Company at this time were estimated to be worth twenty lakhs of rupees.

The silk exports of India reached their highest point in the late sixties of the nineteenth century when $2\frac{1}{4}$ million lbs. valued at a crore and a half of rupees were exported.

Exactly when the Murshidabad silk industry reached its zenith it is difficult to say. The Collector of the District, however, stated in 1872, that the industry had greatly declined during the previous thirty or forty years. There were then in the district some 334 filatures, large and small. Four years later this number fell to 207, employing 10,600 persons, while the number of weavers was roughly 2,000, turning out from 80,000 to 100,000 pieces of silk a year. It is found from the account given in the Statistical Reporter for May 1876 that there were 45 filatures in the district belonging to and under the management of Europeans and 67 filatures belonging to Indians. The number of basins in the former was not less than 3,500 and in the latter not less than 1,600, making a total of 5,100 basins. In addition to these, there were some 97 small filatures, worked by Indians in their homes, containing about 200 basins. The value of the filatures would, therefore, approximately come up to Rs. 4,50,000. As each basin was worked by two persons, the total number of persons employed was 10,600—one half of these representing skilled workmen. The quantity of silk manufactured yearly probably amounted to 3,000 maunds in an ordinary year, its value being not less than Rs. 16,80,000. The amount paid to the rearers of silk-worms of this quantity of silk would be about Rs. 10,80,000 and to the spinners Rs. 1,80,000. To these sums should be added the cost of the establishment—Rs. 2,40,000. Thus the expenditure involved in manufacturing the product of an ordinary year was about Rs. 15,00,000 for spinning only. The weaving of the silk cloths formed another branch of the industry and was also of considerable importance. Looms were found in no less than 137 villages and the number of weavers in the district was computed at 1,900, besides the adult members of their families generally assisting them in the work.

The details given above show what an army of workers was maintained by this industry in the district of Murshidabad alone and what a large amount of money was in circulation among the people on this account. It should also be noted that the mulberry cultivation on 50,000 bighas gave employment to a large number of cultivators.

In 1901 there were, according to the returns of occupations 28,950 persons supported by silk spinning and weaving, while 10,041 subsisted by rearing silk-worms and gathering cocoons. The number was reduced at the census of 1911 to 27,338 and 6,803 respectively.

The latest Census report says, "Silk spinning and weaving employs 4,882 persons and provides subsidiary occupation for 820 more, but the figures are considerably less than they were in 1921."

During the last census operations it was found that silk of more than one kind (*endi, muga, mulberry* etc.) was reeled, spun, and woven in several parts of the Province and reports on it were received from all the districts of the Burdwan Division except Burdwan (mainly from Birbhum and Bankura) and from the districts of Murshidabad, Khulna, Malda, Rangpur and Chittagong.

But the figures of those employed in the different departments of the industry show how the silk industry in Bengal is decaying rapidly.

In 1903 Mr. N. G. Mukherjee in his *Monograph on the Silk Fabrics of Bengal* expressed the opinion that the prospects of the industry were brightening. But his expectation was not realised. From 1886 to 1896 Mr. Mukherjee was engaged in enquiries and experiments with the object of combating silk-worm epidemics and introducing healthier methods of rearing silk worms. He was successful in rearing seed cocoons under the Pasteur system which were far superior to the native seed and his pupils in charge of private nurseries, which he started, were able to make the business pay.

But the industry did not flourish. A few years later the Government of Bengal appointed a Committee to consider the

subject of the decline of the silk industry in Bengal. They proposed several remedial measures, their estimated cost being first year Rs. 63,840, second year Rs. 62,840, third year Rs. 62,840 and the recurring charges in subsequent years Rs. 12,840.

The Committee proposed the following measures in 1907 :

(1) That some 50 more model rearing houses be established as soon as possible at suitable sites in the silk rearing districts on the same model as those already constructed by the Silk Committee. In these houses the seed would be microscopically examined and reared under trained supervision, and sold to the rearers.

(2) That a trial be given of the system suggested by Mr. Cleghorn, e.g. one or two of these houses might be leased to selected rearers who had learnt the use of the microscope, and who would undertake to follow approved methods of rearing.

(3) That a trial might also be made in one or two cases on Mr. Mukherjee's suggestion, in order to encourage rearers to construct such rearing houses for themselves.

(4) That a supply of microscope be kept to be given out on the hire purchase system to leading rearers who could show that they understood the correct use of them, and who could furnish suitable security.

(5) That District Officers be authorised to grant advances on the same terms as loans under the Agriculturist's Loans Act to rearers for expenditure on improvements to their rearing houses, the purchase of approved appliances, disinfectants, etc. This does not seem possible under the existing law.

(6) That encouragement may be given to the planting by rearers and mulberry cultivators of tree mulberry by the supply of seedlings and cuttings from a central farm.

(7) That in districts where silk rearing is carried on the District Boards be moved to plant or to encourage the planting of mulberry trees along the road side and that Government should take steps to plant these trees along canal banks and public embankments.

(8) That a mulberry farm be established in the vicinity of Berhampore on the land so generously placed at the disposal of the Director of Agriculture by one of the members, *viz.*, the Maharaja of Cossimbazar where a nursery should be laid out for the propagation of seedlings of suitable varieties of the mulberry ; where the comparative value of the different kinds of leaf could be tested ; and where experiment could be made as to the value of different kinds of manure for this plant.

(9) That a sustained experiment be carried out towards the production of improved seed of each of the three important varieties, *viz.*, Barapolu, Deshi, and Nistari by careful selections of the purest and best seed from generation to generation and breeding from these. Any attempt at cross-breeding be not recommended.

The partition and re-partition of the Province and other causes were responsible for a full trial not being given to the scheme advanced by the Committee ; and to-day the contents of the very varied list given in Mr. Mukherjee's *Monograph* surprise those who are unacquainted with the historical importance of the Murshidabad silk industry.

The story of Lord Carmichael's handkerchief revealed the neglect that has overtaken this once famous and prosperous industry which brought to Bengal large sums of money every year. The story was told by Mr. Beatson-Bell in the Bengal Legislative Council (Dacca Session, 1915) in his speech accepting Mr. Surendra Nath Banerjee's resolution on the encouragement of indigenous industries. He displayed a coloured handkerchief of silk and narrated the following story :

Lord Carmichael and his father before him had been fond of the type of Indian handkerchief exhibited and had been accustomed to buy this handkerchief from a firm in Edinburgh. When Lord Carmichael came to Madras as Governor he sent a specimen of the handkerchief to the principal dealers in the town and was told that the handkerchiefs were probably manufactured in Bengal. When he came to Bengal, as its first Governor, he made similar enquiries of the dealers in and

around Calcutta, including silk manufacturers. They all examined the specimen and said that they did not know where it came from but thought it was from Bombay. Enquiries were made at Bombay and the people there said that the handkerchiefs were probably made in Burma. On enquiries made in Burma he was told that they were probably made in Japan. Lord Carmichael then sent a specimen to the Department of Commerce and Industries and desired to know where it was made. After several months the reply came that it was probably not a real Indian handkerchief but was made in the South of France. Having failed to secure the necessary information Lord Carmichael requested the firm at Edinburgh to tell him, as a favour, where the handkerchiefs were actually made. Imagine the surprise of Lord Carmichael when he was informed that they were made in a place called Murshidabad in the Presidency of Bengal.

And Mr. Beatson-Bell confessed that in discussing the decline of Bengal industries one feels as if one was passing through a large grave-yard in the dusk. "We see not only the graves of hundreds of past failures, still more eerie, we see open graves waiting for the bodies of dying enterprises." But he asked Bengalees to whistle to keep up their courage. "The tune which I would ask you to whistle would be this, 'If at first you don't succeed, try, try, try again'. We must freely admit that our failures have been many ; but when we look at other countries, we find that their initial failures were still more numerous. For example take Australia. At one time it was a purely agricultural country, but it has been turned into a great manufacturing country. The Australians have worked through countless failures to success, and there is no reason why we should not do the same".

Surely the Bengal silk industry does not even yet merit interment in one of Mr. Beatson-Bell's open graves. It should appeal to the imagination of the Bengalees. It is an ancient and indigenous industry, which draws all its materials, and can draw all the labour it needs, from the Province itself. It should not be allowed to be obliterated.

The lesson to be derived from the story of Lord Carmichael's handkerchief is the neglect of the industry. A writer quoted by Mr. O'Malley in his Gazetteer of the district of Murshidabad, says, "where there is an attempt at advertisement (of the Murshidabad silk) it usually meets with success. It would be a splendid thing for the trade if middle class Bengalees with a small capital were to hawk round the silk products of Mirzapore and other places. At the time of the famine the sufferings of some of the weavers were much alleviated by the efforts of a native gentleman, who advantageously disposed of their goods in Calcutta".

Lord Carmichael suggested that the home workers of the Murshidabad district should be given a chance of displaying their skill in Calcutta and that afterwards a permanent sample house should be established in the city where their works would always be available for purchase. This plan has been tried in many cases in Europe. An exhibition held in London made known the beautiful embroideries produced in almost every cottage in the South Slav countries and resulted in orders being sent from London even to countries so far distant. The organizers of the revived craft of pewter and silver working in Scotland find that it pays them to rent a shop-window in the most expensive street of London in order to attract attention to the wares which they can dispose. Probably, Sir Horace Plunkett's efforts to link up the Irish villages with the populous centres is the most famous as it is the most successful instance of the revival of village life and village industry.

But the Industry has suffered from various causes. Disease among the silk-worms, tariffs placed on Indian silk products in Europe, specially the heavy protective tariff against manufactured silk imposed by the French Government in 1892, and the competition of Chinese and Japanese silks are some of the causes which have contributed to the decay of the silk industry in Bengal.

Among the diseases *pebrine* is one of the causes of the decay of the silk industry of Murshidabad. The results of experiments have shown that the percentage of pebrinised moths

from the same lot of eggs of the univoltine breeds, which are reared in the first part of March when the temperature of the rearing room varies between 64 and 85 degrees F., is less than in those bred in the latter part of March when the temperature in the rearing room varies from 70 to 90 degrees F. The multivoltine *Chotopolu* and *Nistari* races reared in the first and the latter part of March exhibit only 3 and 5 per cent. pebrinised moths respectively. These were all reared indoors. In the case of univoltine worms reared outside on the trees, the percentage of pebrinised moths is very small ; the moths from the lot reared outside are generally healthy, resistant to diseases and admirably suited for reproduction purpose.

These facts should be kept in view in producing good worms. And a better class of worms can be produced by *cross-breeding between both indigenous and foreign races or by careful selection of the indigenous races*. The success which was attained by Mr. Mukherjee in rearing seed-cocoons under the Pasteur system has been referred to before. 'Tariff now can be combated with tariff. And there is no reason why the silk industry of Bengal should not be prosperous once more.

The Murshidabad silk is popular in the Province and has a market outside it too. The following observations made in the Report on the Survey of Cottage Industries explain to a certain extent the difficulties and requirements of the present situation :

(1) *Unsatisfactory reeling*. The workers have no idea of the necessity of using the proper denier of silk for making the different kinds of fabrics, as is the case in the West. The workers do not seem to understand that the texture of their cloth depends on the proper standard and uniformity of thread, nor do the reelers follow any uniformity in regard to the number of cocoons required for a yarn of a particular count.

(2) *Ignorance of the use of dye-stuff and bad finishing*. The silk weavers of most places and specially in Birbhum have little knowledge of the use of dye-stuffs and their methods of bleaching are also unsatisfactory.

(3) *Inefficient appliances.* Throw-shuttle looms are exclusively used for silk weaving as the weavers think that improved looms are unsuited for the purpose of silk and *tusser* weaving.

(4) *Exploitation by capitalists.* The weavers are practically enslaved to *Mahajans*. The idea of co-operative work and general co-operation are foreign to them.

(5) *Want of education amongst the weavers.* Almost all the weavers are illiterate and their ignorance is proverbial in Bengal. They do not appreciate their own interests and view any activity calculated to help them with suspicion and incredulity. They are devoid of any sense of responsibility and cannot be relied on to execute an order in proper time.

Let us take the points in the order in which they have been put.

Unsatisfactory reeling is due to ignorance and amenable to correction. The workers have only to be guided properly to realise the deficiency of their process. We have seen how in the early days of the East India Company a factor "well-skilled in silk" was sent out from England and how the Italian method was introduced in Bengal and adopted by the workers. So, unsatisfactory reeling cannot prove an insurmountable obstacle in the way of the improvement of the industry.

The Murshidabad institution is making satisfactory progress in introducing better dyes and better dyeing processes.

Regarding the appliances it depends on demonstration and propaganda. The Report remarks "A Government silk weaving school at Berhampore equipped with modern machinery has been established and it is calculated that this school will do an immense amount of good to the whole industry by bringing home to the workers the defects of their existing methods of work and teaching them the use of improved machinery. A series of demonstrations in silk weaving on fly-shuttle looms and other appliances given in the important centres of the industry will help very considerably in uplifting the workers and ameliorating their present condition. This work should be undertaken without delay. The Salvation Army Silk Camp

at Changa Manga is an example of what can be done in this direction.

The exploitation of the capitalists is not confined to this industry alone. It has been the bane of various industries in the Province and in the country. Ideas of co-operative work and general co-operation should be propagated. The development of these ideas will work wonders in the industry.

Want of education is surely responsible for many of the ills the industry suffers from. But can the poor workers be held to be solely responsible for this want of education in a Province where primary education is not free and compulsory? It is too much to say that the weavers do not understand their own interests and view every effort at improvement with suspicion and incredulity. That they are shrewd enough to appreciate their own interest can be proved to the hilt and the best means to remove suspicion and incredulity is by demonstration, determined and continued. Once the worker is convinced of the improvement that can be effected by new methods and appliances and organizations he will readily take to them. He is not also devoid of any sense of responsibility. He is often the slave of the conditions under which he has to work. Want of capital and credit, chronic indebtedness, disease—all these and more—combine to make him unreliable, and only a general amelioration of his condition can change this deficiency.

The need for the improvement of this industry is evident and this can be done if better training and financial facilities are given to the workers, whose skill and experience can easily be taken advantage of. Lord Curzon truly said, "In almost every Indian State and Province, in most Indian towns and in many Indian villages, there still survives the art and there still exist the artificers who can satisfy the artistic as well as the utilitarian tastes of their countrymen and who are competent to keep alive this precious inheritance that we have received from the past".

Organisations should be formed, the Central in Calcutta, with branches in the districts where the industry exists. Arrangements should be made to supply better designs and

teach the workers *better methods of rearing silk-worms which should be introduced after due researches and experiments* of reeling and of weaving as also of the use of the improved appliances and dyes through schools and peripatetic demonstration parties. Co-operative credit societies should be formed for the purchase of raw materials and the marketing of finished products. A Central organisation at Calcutta with branches in the silk-producing districts such as Murshidabad, Malda, Birbhum, Bankura, Midnapore, Hooghly, Chittagong, Rajshahi, Rungpur should cater for the needs of the people. The district organisations should take necessary advice from the Central organisation and advise the Subdivisional organisations which will advise the actual rearers and reelers, etc. about work connected with reeling, weaving, dyes and improved appliances, etc. as fully stated in the scheme given at the end of the section.

That men have been found among the weavers who could introduce innovations was proved by Dubraj of Murshidabad, products of whose looms did not suffer in comparison with the products of the looms of Kashmir and Benares. The looms which turned out high class shawls and table-covers for which Murshidabad was once famous could be set only by Dubraj. Not in vain did Mr. O'Malley say in 1914, "The only hope of reviving the art now rests on the fact that Dubraj's looms are still in existence". They were acquired by the Rampur-Boalia Sericultural School and may be carefully examined by experts with a view to make them popular.

We give below an example of what an earnest effort to introduce new varieties can do. Imitation Assam silks or Murshidabad *endis* were introduced by Mr. N. G. Mukherjee in connection with the famine operation in 1897. About 150 families of poor *matka* weavers came for relief, and the only kind of work they were capable of was coarse weaving. "About Rs. 11,000 was spent for their relief, including cost of materials, and the fabrics they were made to weave realised by sale about Rs. 10,000". Needless to say that under fostering care the industry can be developed in different directions.

What has been said above about the Murshidabad silk (and

Malda and Rajshahi silk may be included in the same category) applies almost with equal force to the *tusser* and *endi* industries in Bengal. *Tusser* is produced in the districts of Birbhum and Bankura in large quantities. A note submitted to the Indian Industrial Commission by a gentleman connected with the trade in Bihar pointed out the main disadvantages under which the *tusser* weaver labours. He pointed out that the *mahajans* or dealers in these cloths advance money to certain weaver families and as in all dealings between a clever man of the Bazar and the simple man of the village the *mahajans* always try to buy these cloths from the weavers at a discount of 15 to 20 per cent. below the normal wholesale market value. Another point is that the weavers go on weaving the same old patterns and the same old kind of texture which no longer find favour with the purchasers.

Much useful work has been done to improve the industry in Bihar by the Bhagalpore Silk Institute started in 1922, and the turnover in the trade rose from 8 lakhs of rupees in 1922 to 25 lakhs in 1929. About 10,000 persons, moreover, have taken to *endi* rearing in Orissa. Judging from the supply of the Silk Institute alone, the output of *endi* cocoons and yarn was estimated in 1932 to be over Rs. 10,000 per annum. This covers the expenses of a number of activities of the institute.

The Textile Expert to the Government of Bihar and Orissa reported in 1933 that the *Bafta Chaddars* woven with *tusser* warp and cotton weft, are manufactured mainly for the jute growers of Bengal. As per annual publication of the Bengal Government on the internal trade of 1885-86 it was estimated that Bhagalpur produced *Tusser* and *Bafta* goods worth Rs. 1,13,000. Mr. Byrne in the District Gazetteer of 1911 mentioned the existence of only 1,000 looms in the town and the number has now risen to 1,650 of which 1,374 are of the improved type. According to the estimate of some of the merchants of Bhagalpore the sale of silk goods of this centre increased steadily from Rs. 1,00,000 in 1890 to Rs. 2,00,000 in 1900, Rs. 4,00,000 in 1904 and Rs. 8,00,000 in 1922 reaching the highest figure of Rs. 25,00,000 in 1929, i.e. just before the

economic depression set in. That a very large portion of the goods sold in Bengal has already been pointed out. Can there be any reason why Birbhum and Bankura should not weave *Baftas* with their *tusser* for the jute growers of the Province? The *tusser* weavers of Bihar have begun to use fly-shuttle looms of which over 2,000 were introduced in the course of the last ten years. The Bihar Government have taken necessary measures to demonstrate to the weavers the advantages of *dobbies* and the jacquard loom and the use of fast dyes. "With a view to profitably utilise the *tusser* waste locally a few persons . . . were taught to spin this waste into yarn and the woven *chadders* after being dyed in different colours, so as to make them attractive, were displayed and sold at Bhagalpore". This waste was also spun on power machine at the Central Jail Factory at Bhagalpore as an experimental measure and was found to produce good yarn. Here the Bengal Government can profitably take a leaf out of the book of the Government of the sister Province, specially because the importance of the silk industry in any province or country is more on account of the large number of artisans that are kept employed in such operations as reeling, spinning, winding, doubling, twisting, bleaching, dyeing, weaving and finishing, than for the reason that it provides a subsidiary occupation of silk rearing to a small peasant population. In the Province of Bihar and Orissa the reeling and weaving of *tusser* provides work for over 3,500 silk weavers and their family members who attend to reeling and the preparatory processes of weaving. The inhabitants of the district of Bankura are depressingly poor and the development of this industry is sure to bring about a welcome change in their economic condition. No systematic and sustained effort is made to cultivate the *tusser*. This ought to be done in Bankura and similar other places and the weaving of *Bafta* introduced.

The activities of the Silk Institute have been summarised broadly under the following heads:—

(1) Training of young artisans in silk rearing and manufacturing with modern appliances and methods.

(2) Conducting experiments and demonstrations with a view to improve various branches of the silk industry.

(3) Designing and manufacturing new designs in silk goods and carrying on some commercial work in order to secure new markets both domestic and foreign for Bihar silk and to popularise the same.

(4) Introduction of *endi* rearing and spinning as a subsidiary occupation of the agriculturists in the Province.

(5) Introduction of sericulture in places where favourable conditions exist for growing mulberry and rearing of silkworms.

In Bengal we need an Institute of this kind to devote itself to the industry and the expenditure incurred on this account would be fully justified. The present expenditure on the Bihar Institute is, on an average Rs. 10,000 per year. With an Institute like this it would not be difficult to introduce *endi* and develop the *tusser* industry which has immense possibilities in Bengal.

Not only by protection but by other means also the Government should help the industry. We have already referred to the protective duty on Indian silk levied by the French Government. And we would conclude this section with a reference to the work done by two Indian States, Mysore and Kashmere.

The Mysore Durbar established Government "grainages" *which issued selected seed to the raiyats thus improving the yield from 50 to 100 per cent. ; while the filature established at Mysore came to produce a superior silk which found a ready sale in Europe.* The Mysore Durbar has now taken the following steps :—

(1) Selling the domestic basins at a price very much below the cost price. A word of explanation may be necessary here. Arguing the case of increased duties for silk the Director of Industries and Commerce, Mysore said that he would encourage the Mysore domestic basin in preference to the *charka* re-reeling because of the good quality of silk produced by the former. There is uniformity in the silk thus produced, whereas in *charka* silk, it is difficult to maintain uniformity. He held

that the *charka* would go out by the operation of economic forces and expressed the opinion that its replacement by the basin will take place in course of fifteen years.

(2) The Silk Association, which is the non-official organ of the industry, is subsidised by the Government.

(3) The Government have placed one branch of the co-operative department at the disposal of the sericulture industry.

The Kashmere Durbar has, in the matter of the silk industry, waded through difficulties and failures to success; and to-day the Srinagar factory is the biggest of its kind in the world. Though this factory must necessarily come under the Big Industries it still depends on the cottage industry. To maintain its pre-eminent position the State authorities have been, from time to time, sending officers to various parts of the world to study the mechanical and other improvements for the production of the best quality of silk on the most economical lines with a view to their introduction in the State. •

Silk-worm rearing was started on scientific lines in 1898. During that year 415 ounces of eggs were distributed amongst 400 rearers, and produced 469 maunds of cocoons. This quantity was gradually increased till in 1904, 26,000 ounces of eggs were distributed amongst 11,000 rearers and yielded 16,000 maunds of cocoons, the average of these seven years working out at 16,000 ounces of eggs distributed amongst 4,900 rearers and 9,500 maunds of cocoons produced. From 1905 to 1913 corresponding averages were 30,200 ounces of eggs, 22,000 rearers and 28,000 maunds of cocoons. From 1914 to 1927 the average eggs were 30,200 ounces, rearers 44,800 and cocoons 33,300 maunds.

The eggs are issued by the State Department shortly before they are ready to hatch. The quantity issued is about 42,000 ounces. The eggs are given to the peasants free, according to the size of their houses and the number of members in the family. Probably about 180,000 to 200,000 men, women and children are directly engaged in this work. It is worthy of note that whereas formerly persuasion and pressure were needed to get the peasants to rear the silkworms, the difficulty now

is to limit them to the real amount of eggs which they are capable of rearing.

This shows what State aid can do for the silk industry. The three salient features with regard to sericulture in Kashmere are the abundance of mulberry trees, the suitable elevation and the favourable climate. In Bengal the mulberry plant grows well and the climate is favourable for silk weaving. What is necessary is to develop the industry once more and that on scientific lines. It was only in 1889 that, after the wholesale destruction of the whole crop of silkworms in 1878, the Kashmere Government again decided to experiment with the production of eggs on the Pasteur system. We have seen how in Bengal Mr. N. G. Mukherjee was successful in rearing seed-cocoons under this system. Had the proper amount of effort been put forth the silk industry of Bengal would surely have become prosperous once more.

The Ottawa Agreement referred to silk and recently a new duty has been imposed on silk as there had been considerable increase in silk import and the indigenous silk industry was being threatened.

These are advantages which would go a long way to help rehabilitating the industry in Bengal. This can be accomplished in course of five years, by establishing a Central Silk Institute, like the one at Bhagalpur, for the introduction of superior appliances, research and experiment and by organising demonstration together with providing financial and marketing facilities to the workers, preferably through co-operative organisations as is being done in the Mysore State.

Mr. Maxwell-Lefroy, Imperial Silk Specialist, suggested the following under present circumstances :—

(1) Increase the output from the nurseries very much. They should work at the maximum of output.

(2) Use the available selected rearers, supervising them as closely as possible.

(3) As soon as possible, extend the nurseries.

Mr. G. S. Dutt has rightly remarked :

“As in Japan, so in Bengal, if sericulture can be introduced

in every village the national wealth could be increased by crores of rupees in the course of five or six years and rural poverty would practically disappear."

The cold season in Bengal, from October to March, resembles the silk-rearing season of Japan, Italy and France and the hot and rainy seasons that of Southern China, where they have many brooded races like those of Bengal. Bengal has the advantage over other silk producing countries in being able to rear her best crop during her winter months, when other silk-rearing countries are at a stand-still owing to their severe winters. A French silk-expert, Prof. Lafont, has remarked, "The month of November is extremely favourable for the rearing of cocoons in Bengal, even more favourable than the spring in Europe".

The work involved in sericulture is of a light and varied nature and very interesting in all its stages from the hatching of the silk-worm eggs to the harvest of golden and white cocoons or the final reeling, spinning and weaving—subsidiary industries, very suitable for the families of the educated classes.

Raw silk is the most valuable crop produced in Bengal. The Japanese, realising the enormous demand for good silk in comparatively recent years, planted out every available bit of land with mulberry, and every home has a mulberry garden with its spare room for silk-worm rearing. The result is her large outturn of silk, bringing immense wealth to the people.

Silk culture is a link between agriculture and the cottage industries. The agricultural side is the cultivation of the mulberry which is a *permanent crop* and *produces five crops of leaves in the year*. Bengal is the home of many species of silk-worms. Silk when reeled in a continuous long thread is sold at Rs. 18 to Rs. 45 per seer according to quality. To use the seasons of Bengal to the fullest advantage it is advisable to rear one, high-yielding annual crop in the cold season, February and March, one *Chotapalu* crop in October and one or more *Nistary* crops from April to August, along with several crops of *endi* (one of the quickest of silk-worm crops known) during the rainy

season in September as castor oil plants are fairly abundant and self-sown.

We have only made a short reference to the *endi* silk which has come from Assam. There is an increasing demand for *endi* silk and yarn. The silk has to be spun like cotton. The market rate is Rs. 10 to Rs. 14 for a seer of *endi* yarn spun on the *charka* while hand-spun cotton only realises Rs. 2-8 a seer. The *endi* silk worm feeds on castor leaf which grows neglected and in abundance. Says Miss Cleghorn :

"The capital outlay for rearing these* silk-worms is negligible. A bamboo rack, a few baskets and mats for rearing and palm leaves or folds of cloth for them to spin among are the simplest requirements which even the poorest villager can obtain.

"Five trays or mats of *endi* silk-worm produce about 1,500 cocoons, the silk of which when hand-spun yields a seer or two pounds of *endi* yarn valued at Rs. 10 to Rs. 14 per seer. Besides being the quickest silk-worm crop known, taking 15 to 20 days from hatching to spinning, it has the advantage of converting a jungle into silk of high price."

What rural reconstruction work can be more useful and desirable than inducing the poor villagers to take to *endi* cultivation? Should not the educated classes of Bengal undertake this work and co-operate with the Government in popularizing this industry? In this connection we cannot do better than quote what Prof. Lefroy has said :

"If ever the well-to-do and well-educated landowners and people of influence take up sericulture as an industry beneficial both to their tenants and themselves it will develop more rapidly than it can under any other system."

Here is an opportunity and an opening by which the landowners growing impecunious owing to subdivision of property and people of influence whose sons are swelling the army of the unemployed would do well to utilise. More than thirty years have elapsed since Sir Herbert Hope Risely drew pointed attention to the growing distressed condition of the middle classes. He wrote in his Introductory Remarks in the Report

on the Census of India, 1901—"The middle classes in the towns have suffered appreciably from the general rise of prices which has taken place during the last few years. They do not share in the enhanced profits of agriculture ; from trade they hold aloof ; they have to pay more for the necessities of life ; wages and salaries have not kept pace with the rise of prices and have, in some cases, been forced down by competition ; the standard of social expenditure is higher and social obligations no less stringent than they were a generation ago, and life is in many ways harder for respectable families who live on salaries or pensions and struggle to keep up appearances in an ancestral house built in more prosperous times". Another generation has come and gone since the above was written. Unemployment has assumed alarming proportions, a large number of landlords have found it safer—almost inevitable—to make over the management of their estates to the Court of Wards if only to avoid or defer utter ruin. These classes can be doing a great service to themselves and to the people generally if they accept the advice given by Prof. Lefroy and engage in sericulture which has a great future and which will surely develop and increase the wealth of the Province. They can easily remedy defective rearing of the worm, defective reeling and weaving and defective organisation and thus ensure prosperity for the industry, for the people and for themselves. Can they afford to neglect this opportunity ?

The plan, therefore, boils down to the following formulas :

(1) A bold and settled policy must be adopted to forge ahead with the silk industry in its various departments, i.e. mulberry silk, *tusser* and *endi*.

(2) A central silk institute should be established by the Government to undertake

(a) Experiments to ascertain the best kind of mulberry for the different centres and introduce it and encourage its cultivation,

(b) Experiments to eliminate disease in the worms and produce healthy and better kinds of seeds by selection and breeding or cross-breeding,

- (c) Distribution of the improved seeds among rearers as is being done in Kashmere and issuing of instructions to them to rear the worm properly and profitably,
 - (d) Arrangement of demonstrations in improved reeling, improved looms and other labour-saving appliances for weaving and supply of better dyes in the various centres,
 - (e) Supply of improved patterns, and
 - (f) Organisation of co-operative societies for buying and selling and thus making the workers independent of the *mahajans* or middlemen who eat up the profit.
- (3) The work stated above should be done through District Organisations which should be in intimate touch with the producing centres and organise the workers in every centre, and give them lessons in rearing.
- (4) One high-yielding annual crop in the cold season, one *Chotopalu* crop in October, or more *Nistari* crops from April to August along with several crops of *endi* should be raised.

The Coir Industry

The possibilities of the coir industry are neither mean nor far off in Bengal. Yet Bengal has practically no share in it. Its importance becomes apparent when it is found that it was specially mentioned at Ottawa. The Report of the Indian Delegation to the Imperial Economic Conference (1932) gives the following value of the imports from India into the United Kingdom :—

Commodity		Value of trade in 1929	Preference
		in £1000	
Coir yarn	... ..	619	10 per cent.
Coir mats and matting		438	20 „

Regarding schedule (a) in which these products are included we find the following in the Trade Agreement between

His Majesty's Government in the United Kingdom and the Government of India :

“Article 4. His Majesty's Government in the United Kingdom undertake that no order will be made and that Parliament will not be invited to pass legislation which would have the effect of reducing the margin of preference now enjoyed by Indian goods of the kinds specified in schedule (a) over similar foreign goods, and further undertake that, in the event of any greater preference being accorded in respect of such goods imported from any other part of the Empire such greater preference will be extended to similar Indian goods”.

Coir thus gets an advantage which cannot be overlooked.

The best known of the by-products of the cocoanut tree is the coir which is obtained from the thicker outer wall of the fruit. In the Malabar districts of Madras many thousands are engaged in this work, and find it profitable. The process adopted is simple. When the nuts are collected experienced men carry on the processes of husking. An iron spike is driven into the ground with the point upwards. The nut is then stuck on this, the point penetrating between the nut and the husk. By a little pressure the two are separated. An expert worker can separate as many as a thousand a day. Though machinery has been tried, it has been found less successful than the old-fashioned way. After husking, the husked part is placed in brackish or saline water for several months after which they are crushed. The fibre is separated into various qualities, the long fibre for spinning purposes and the short for brushes, mats, etc. Mattings also are made out of the fibre.

From the Report of the Special Officer deputed by the Travancore Durbar for the British Empire Exhibition it appears that the largest number of enquiries from Europe and America was about coir mats and mattings. Though coir yarn is produced in large quantities in Ceylon and the Philippine Islands the quality of Indian yarn is far superior to them. But the

demand for coir yarn is much greater than that for mats and mattings the reason being that Belgium, Holland, Germany and other European countries have their own factories for the *manufacture of mats and mattings to suit local taste, and requirements*. To capture European and American markets the Indian manufacturers must study their tastes and requirements carefully. As it is, the manufacture of yarns, ropes, rugs and mattings of cocoanut fibre is already one of the most important industries on the Malabar coast. In Cochin and Travancore alone more than 200,000 men and women are engaged in this industry and it is a significant fact that in this industry the labourers are mostly women.

In his Report the Special Officer deputed by the Travancore Durbar had made a statement which is of special interest :

“It is only the experienced workers in the industry who can find the difference between good and bad nuts and they know much more than what modern industrialists know. Those who are inclined to modernise the fibre-making industry may not care to accept it, but the fact remains that hand-labour has been found to be more suitable than machinery for purposes of removing the husks and taking the fibre out of them by the ‘beating process’. It is in this beating process that the women labourers are experts. When the fibre is extracted it is to be dried and cleared of its dust and refuse. Then the fibre is separated into various grades”.

The selection of grades requires hard labour. Thus the industry must be considered to be primarily a cottage industry in which both men and women can earn a livelihood. Then again though there is the machine-twisted yarn, the hand-twisted yarn is considered to be much superior and has always a ready market. The industry is very old in Madras. It is mentioned that both fibre and the hand-twisted coir were being exported to Europe as early as the sixteenth century, but it seems coir rope and matting reached commercial importance only at the time of the Great Exhibition of 1851. Their commercial importance is being successfully maintained in the

markets of Europe. A good portion of the locally made yarn is exported to European countries, and the rest is converted into ropes, rugs and mattings. Ropes are spun by a simple machine worked by hand, while rugs and mattings of different textures and designs are generally woven on hand-loom.

Bengal produces large quantities of cocoanut but the by-product is practically unknown in the Province, a fact which has to be deplored. It is to be regretted all the more as Bengal provides a large and ready market for the fibre and coir goods of all descriptions. •

It is generally believed that the Bengal coir is inferior in quality to the Malabar coir, because it is only the trees on the sea coast that yield the nuts best suited for taking fibre and the greater the distance from the coast the coarser the fibre. But even in Malabar there are different varieties of cocoanuts, some of them rich in their yield of fibre and some not so. The "Anjengo" and "Alapad" varieties are the best. And it is not a fact that the people there use only these famous varieties and discard the rest. If the price of "Anjengo" yarn be Rs. 120 per candy, "Beach" yarn would not fetch more than Rs. 40. The quality may also depend on the method and process of extraction. In the case of the "Anjengo" retting is done under very favourable natural conditions in *brackish* water whereas in the case of the "Beach", in the absence of this facility, ordinary water has to be used. This will have to be done in Bengal as well.

In the absence of proper investigation it would not be safe to pronounce that the Bengal fibre will be inferior in quality to the Malabar product. Even if it proves inferior that is no reason for rejecting it. Coir has at least three uses, *viz.*, for rope making, for brush making and for stuffing mattresses and furniture. The fibre which is used for rope making may be conveniently used for weaving rugs and mattings. But the inferior quality fibre can easily be utilised for brush making and for stuffing purposes. For the latter there is a large market in Calcutta and the market is expanding rapidly.

It is painful to witness the huge waste of the fibre in all

parts of Bengal and specially in Calcutta where thousands of cocoanuts are thrown away after taking the water for drinking and, in some cases, the copra also.

It has been ascertained that the annual value of coir in Travancore, a State with an area of only 7,624 sq. miles, is estimated to be more than one and a half crore of rupees.

The conditions considered to be necessary for the success of the coir industry in Travancore are

- (a) Felling of cocoanuts just at the time of ripening ;
- (b) Hulling as soon as possible and carrying the husks to the retting pits in fresh condition ;
- (c) Retting the husks in places where the water is more or less saltish and subjected to periodic change ;
- (d) Soaking in water for a period varying from six months to one year, i.e., till the husks become completely softened.

The first, second and fourth conditions stated above as contributing to the success of the coir industry in Southern India can easily be complied with in Bengal, if only it can be brought home to the people that the industry gives a money return. Mr. H. P. V. Townsend, I.C.S., in his note on the Manufacture of Coir (Bulletin No. 12, Department of Industries, Bengal) remarked :

“Since the manufacture of coir is a new thing in this Province, people are not likely to be persuaded in the first place to spend money on husks only to leave them to soak for months before they start manufacture ; they will wish to see immediate results while they will retain their first enthusiasm. For this reason it is better to attempt to introduce the making of unsoaked coir to begin with. Afterwards when they see that its manufacture is profitable, people will doubtless need no great persuasion to undertake the more profitable manufacture of soaked coir also”.

Unsoaked coir takes less time but needs harder work, the details of which we need not enter into.

The condition regarding the retting of the husks in brackish water has to be considered. In this matter Travancore has the natural advantage of brackish water in the cocoanut growing districts. This is not the case in many parts of Bengal. But there are places in Bengal in the districts of 24-Pergunnahs, Midnapore, Howrah, Khulna, Barisal, Noakhali and Chittagong where the water in the rivers and the *Khals* is brackish and can be utilised for the industry.

Bengal has a vast deltaic area near the sea and cocoanut palm can be grown there easily. The cocoanut is plentiful throughout the lower Gangetic basin and in the districts of Backergunge and Noakhali it is extensively grown in plantations by itself or along with the areca-nut palm. In many countries such as Guam a specially long fruit is grown for the express purpose of affording the long straight-bristle fibre. This variety may be *experimented with in the Bengal plantations*.

It must also be remembered that coir is not the only by-product of the cocoanut, another by-product being copra, the kernel of the cocoanut sliced and dried in the sun or artificially.

This contains a large amount of oil, sometimes as much as 70 per cent., and various processes of extracting it are followed. Large quantities of copra are exported to foreign countries where the oil extraction takes place. But there is no reason why the oil should not be extracted here and sent to foreign countries. It may be used for cooking and toilet purposes and for the manufacture of candles. In Europe it is largely used in connection with various fancy toilet articles. Its use in the manufacture of soap also is important. The long, black, lustrous tresses of the Philippine women have been attributed to the use of this oil. Pure cocoanut oil has for some time been used in part manufacture of margarine and with advantage since it supplies a certain amount of glyceryl salts of fairly low fatty acids, whose absence from ordinary margarine constitute chemically the principal difference between that product and butter. But a far more important industry than the adulteration or fabrication of margarine is the production of cocoanut

butter or cacao butter which has the pleasant odour of chocolate and melts in the mouth with a bland, agreeable taste.

The oil industry may be profitably developed if plantations are created for the purpose of developing the new industry in coir in Bengal.

The following may be considered to be suitable centres for the development of the coir industry in Bengal :

(1) Midnapore	Ramnagar	Contai	sub-division
(2) „	Gaonkhali	Tamluk	„
(3) Noakhali	Sonapur	Sadar	„
(4) Howrah	Rajgunj	Sadar	„
(5) „	Baniban	Uluberia	„
(6) „	Hat Basudebpur	„	„
(7) „	Kharuberia	„	„
(8) Khulna	Chandkhali	Sadar	„
(9) Chittagong	Halisahar		
(10) 24-Pergunnahs	Diamond Harbour		
(11) „	Falta Fort		
(12) Barisal	Patharghata	Pirojpur	„
(13) „	Bagabandar	Patuakhali	„
(14) „	Daulatkhan	Bhola	„

Needless to say, Calcutta to-day is the biggest centre of the raw material. In Edinburgh the Municipality prevents people from throwing their waste paper away on the streets and provides them with receptacles in which paper is deposited to be carried away later by the Municipality's men. Cannot the Calcutta Corporation make necessary arrangements for the collection of cocoanuts thrown away and sell them at a nominal price to cover the cost of collection, in the beginning, to people who would sell them to those engaged in the industry? It will not only conduce to keep the streets comparatively clean but also add to the income of the Corporation. Saltish water is available at a short distance from Calcutta and the empty cocoanuts may easily be taken to a convenient place where they are to be treated.

In the selection of the places the following should be

ascertained by careful study of the centre itself and the surrounding places lying within a radius of about twenty miles :

- (1) Degree of salinity of the water,
- (2) Distance from the sea,
- (3) Quantity of husks likely to be available,
- (4) Means of communication,
- (5) Cost of transport of husks to the retting ground from the neighbouring places, as also of finished products from the retting ground to the nearest railway or steamer station. This information is required to ascertain if the industry will be a sound business proposition, and a careful study of this question is necessary.

We will not raise here the vexed question of railway rates which stand in urgent need of revision in the light of the needs of the industries. The Government of India had addressed the Railway authorities on the subject of affording facilities for the carriage of raw materials for industries as also for finished products. But apparently very little advance has been made. Without cheap transport facilities indigenous industries cannot thrive till they have passed the nascent stage.

- (6) Labour, for unless cheap labour is readily available it is difficult to establish an industry,
- (7) Occupation of the local people other than agriculture,
- (8) Possibilities of the local people being interested in the industry.

The total cost for conducting this investigation will hardly exceed Rs. 10,000 and this expense is certainly *worth incurring* when the raw materials necessary for the industry are abundant and its prospects seem to be bright.

The Government should conduct the survey and consider what help they can render the industry during its initial stages.

In the meantime experiments may be made under Government guidance and supervision in one or two selected centres.

Reference has already been made to the by-product and the importance which the copra industry can attain. We have also referred to the products of the copra which are important.

There is yet another use to which the cocoanut can be put. The shell, at present, has only one use. It is used to manufacture, out of it, the *hookah*. But the Burmese and the Japanese manufacture various articles of utility out of it and some of them are prized in Europe and America as art products.

But the most important use to which the shell can be easily put is the manufacture of buttons. The demand for buttons of various kinds in the Province and in the country is on the increase ; and Japan alone exported to this country buttons of all sorts worth Rs. 5,36,000 in 1930-31 and of the value of Rs. 7,24,000 in 1933-34. Nice and cheap buttons can be made out of the shell which, like the husk is now thrown away as useless. It should be utilised. When more cocoanut trees are planted for the coir industry the copra and the shell also should be properly utilised to add to the wealth of the Province now in need of industrial development.

The Durri and Carpet Industry

Though of minor importance as an industry, the weaving of *durris* or *satranjis* has been in existence in Bengal since a long time. In his Report on the *Survey of the Industries and Resources of Eastern Bengal and Assam* published in 1908 Mr. J. N. Gupta wrote as follows :

“Amongst miscellaneous cotton fabrics mention may be made of the *durris* or *satranjis* of Rungpur. It is now a declining industry and hardly 100 families are supported by it”.

The Report on the *Survey of Cottage Industries in Bengal* published in 1924 states that the total number of men employed in this industry in Rungpur is from 35 to 40 (5 in Parbatipur, 16 in Pirijabad, 10 in Damodarpur and 6 in Barabari), but adds that “their economic condition appears to be good”.

That the use of *durris* and carpets are on the increase goes without saying.

Carpets fall under two heads. The most ancient are those that are produced by weaving, and the more modern are those that are produced by both looping and weaving. Sir George

Birdwood is of opinion that the former (called *durris* or *satranjis*) "illustrate the most ancient ornamental designs in India, perhaps earlier than even the immigration of the Aryans". The manufacture of pile-carpets (called *galichas* and *dulichas*) was probably introduced by Persian workmen and their descendants, who came to India and settled in the cities founded by the Mohammedan conquerors. Persia was recognised as the home of the best carpets and the rich Moslems in India procured them from that country to be used as prayer-mats and floor rugs. *Galtchas* have their pile made of wool and *dulichas* of cotton.

The decline of the industry in Rungpur need not be construed to mean that the weaver of *durris* in Bengal cannot compete successfully with the weavers in the other Provinces, specially in the United Provinces where *durris* made in Agra, for instance, have a reputation for durability. The industry is being carried on by many young men of the middle classes in Bengal in and around Calcutta. They often employ workers whom they help in their work. The vicinity of Calcutta affords them the double facility of purchasing the raw materials directly from the dealers and of disposing of the finished product in the city both to individuals and to dealers. The manufactured products of these young men have been successfully competing with goods imported from Agra which are produced by hand labour and those from Cawnpur which are produced by machinery. The products of these cottage workers have to a great extent ousted *asans* from the United Provinces. These young men being intelligent and educated, appreciate the excellence of quality which tells, and in pursuance of it produce very good stuff. What is more, they adopt new patterns and take care in the blending of colours. This industry has taken root in Bengal and is flourishing as a cottage industry which has immense possibilities. If only some of these producers can combine to purchase the yarn at the wholesale rate and have a depot in Calcutta where their goods could be kept for display and sale and for receiving orders they will certainly do better than they are now doing.

Regarding pile-carpets the author of the Monograph on *Carpet-weaving in Bengal* remarked :

"The carpet-weaving industry never took hold of Myrshidabad or Calcutta. The damp and warm climate of lower Bengal is unsuitable for rearing sheep or using carpets to any extent, and the mat-weaving industry of lower Bengal may be regarded in the light of a substitute".

But it is passing strange that he referred only to woollen carpets or *galichas*. The *dulichas* have their pile made of cotton and there can be no reason why they would not be manufactured in Calcutta, for instance, as readily as in Agra or Delhi. What is required is the introduction of this industry and demonstration of its possibilities.

The mode of living of the well-to-do people in Bengal since the extract quoted above was written (in 1907) has changed and the carpet is to-day in extensive use in the dwellings of well-to-do people and of others who have an inclination to European ways of furnishing their houses. Indeed they use the carpet (the *galicha*) with lavish profusion, and the climate of Bengal does not prove a bar to its use. Large sums of money go out of Bengal every month for these carpets and it is found that in the jails of Bengal woollen carpets are woven and find a ready market. The question of rearing a better breed of sheep for wool will have to be considered by the Province, but before that, the weaving of these carpets can be done in Bengal with wool imported from other places as raw materials for this industry.

Hosiery Industry

The hosiery industry, as has been said in the *Report on the Survey of Cottage Industries in Bengal*, was the outcome of an industrial awakening which followed in the heels of the Partition of the Province and gained an impetus from the Swadeshi movement. In the Survey Reports of Messrs. Cumming and Gupta it finds no mention. But the curious reader will find in the pages of the Minutes of Evidence (Bengal)

of the Report of the Industrial Commission mention of the inauguration of the industry in Bengal on a large scale. Mr. Bhupendra Nath Basu in his evidence before the Commission stated how, after change of hands, one calls them vicissitudes of fortune, a factory came to be managed by him. The attempt, however was short-lived and it was years after this that factories on a big scale were established in Bengal. The use of hosiery, i.e., socks, jerseys, etc., has become almost universal among the upper and middle classes in Bengal; and the latest figures available for Japan show that the imports from that country into India have been as follows:—

Year		Rs.
Pre-war average	... ..	65,23,000
1930—31	... ..	76,51,000
1931—32	... ..	41,53,000
1932—33	... ..	61,23,000

The value of imports in 1932-33, i.e., when the economic depression had become acute and the purchasing power of the people had been very low and when, moreover, hosiery factories had been started in various parts of the country, demonstrates the growing importance of the industry.

In addition to Japan the United Kingdom has also been sending hosiery goods to India. But the competition of Japan had been so unfair that the industry in India was on the verge of collapse. Protection was demanded and the Tariff Board considered it necessary to prescribe protection for the nascent industry which was growing.

That the industry has assumed importance and has almost unlimited possibilities of expansion goes without saying.

Though to derive utmost benefit from it the industry should be carried on on a large scale as a big industry it is not impossible to carry it on as a cottage industry provided proper organisation is made for it.

The *Report on the Survey of the Cottage Industries in Bengal* aptly remarks:

"It can be managed with a small outlay of capital, if it is undertaken on a modest scale with hand-knitting machines ; but the financial return is very poor."

It is so under ordinary conditions.

But the industry can be organised on a cottage industry basis to bring a return to the workers—men and women—working in their spare time. In this case the yarn should be supplied by a dealer who may or may not also supply the machine on the hire purchase system and the output would be taken by him at a fixed remuneration. If the same patterns are given and machines of the same make and type are used the outturn will be of the same kind and it will be possible to sell them in the market with the same trade mark, the products being of the same standard. The dealer who adopts this method of work will be able to purchase the yarn at a comparatively cheap price and as the workers will not have to incur any outlay they will be satisfied with a small remuneration. This method of work has proved successful in most cases ; and it has provided occupation to men and women who would otherwise have remained unemployed. Any addition, however, to the meagre income of our people would help them to raise the standard of living. The time has come when every man and woman must work and work hard to increase the wealth of the nation and it is only by such effort that it will be possible for us to overcome the deficiency in capital which now stands in the way of our establishing big industries and taking our place among the manufacturing nations of the world. It is found in the Report that in the Nadia district, for instance, underwear and socks are manufactured using hand-knitting machines and the products are sold locally.

Here is an opportunity for unemployed young men organising a society for the purchase of a few knitting machines and yarn to be given to co-villagers who would produce the standard pattern socks and underwear and sell them to the society, thus earning something to add to their slender resources. The society can then arrange to send the produce to the nearest

town or to Calcutta to be sold there at the market price which will have a clear margin of profit for them. They will also get something as hire for the machine which the workers will themselves like to possess as soon as they earn enough to do so.

The cottage industry can always afford to be content with a small profit.

The price of machines can be ascertained by reference to the Department of Industries, Bengal.

Fancy Goods

Hand operated Flat-bed, Jacquard machines for making fancy outerwears, in wool, silk or combinations. Designs made by hand with Jacquemat apparatus.

1 Machine, 1 Overlock sewing machine, 1 Chain sewing machine, 1 Button-hole attachment with 1 foot-drive sewing machine, complete plant about Rs. 3,500.

Production will be about 3 to 5 pullovers per day.

Number of men employed—one family with all the male and female members can easily run this business. The profit is fairly good as hand-made pullovers are appreciated everywhere and, therefore, are sold at remunerative price.

Socks

Hand operated socks machines with design-wheels for the production of socks and hoses.

1 machine and some wooden shapes with extras will cost approximately Rs. 350.

Generally 2 or 3 men or women are required to run the concern, although the profit in this case is not high, yet several families can run this and earn whatever they can by learning knitting.

<i>Receipt side per day.</i>		<i>Expenditure per day.</i>	
	Rs. A.		Rs. A.
A. 4 pullovers per day		Yarn (say 1 lb.) at	
at Rs. 5 per piece	20 0	Rs. 4 per lb. for	
B. 6 pairs of socks at		Fancy Goods ...	4 0
Rs. 3-8 per dozen	1 12	Yarn (say ½ lb.) at	
		As. 8 per lb. for	
		socks ...	0 4
		Labour at Re. 1-8 per	
		head * for fancy	
		goods ...	3 0
		Labour at Re. 1 per	
		head for 2 labourers	
		for socks ...	1 0
		Interest, per day ...	1 0
		Other charges per day	2 0
<hr/> Total receipt—Rs. 21 12		<hr/> Rs. 12 4	

Boot and Shoe Lace Industry

Boot and shoe laces are articles in everyday use and are consumed in large quantities all over the Province. At present all laces are imported from foreign markets, specially from Japan. But the process of manufacture of the laces is extremely simple and there seems to be no reason why the industry should not be established in Bengal. Evidently we spend a large sum annually on these laces.

The process of manufacture, as has been said before, is simple. The yarn is prepared on winding machines and passed through a braiding machine which turns out laces of the desired type. The braided laces are cut into standard lengths and the metallic portion fixed by means of simple mechanical devices. Boot and shoe laces are generally of three types—*flat*, *tabular* and *round*. Different types of machines are required for the manufacture of the three types of laces, but they work on a common frame.

The industry may, in the first instance, be started as a

cottage industry in which case the braided laces would have to be purchased. By securing simple mechanical devices for fixing the metallic portion one can produce laces.

Needless to say that this will not bring a large income to the manufacturer who himself can gradually—as he secures the capital—or jointly with others set up machinery necessary for a factory in which all the processes would be worked.

It will then come under the small industries carried on in factories and not in workshops.

At present Bengal can hardly be said to possess a lace factory ; and the place in which it will be started first will be able to capture the market and thus, being first in the field, reap the fullest benefit from the industry.

The establishment of this industry will open up a new line for the existing mills which do not at present produce yarn necessary for the production of these laces.

A list of machinery required for a factory capable of producing all the three types of laces with an approximate daily output of 5,500 pairs of laces in 8 hours will be found in the Small Industries Section.

If run as a cottage industry the worker can be helped by the women and children of the family.

Brass and Bell-Metal Industry

The Brass and Bell-metal industry is next in importance to the hand-loom weaving industry in Bengal.

For generations past the industry has kept employed thousands of workmen, working as they do in the cottages of Bengal, supplying articles and utensils of domestic use to the villagers in Bengal as well as to the townspeople, rich and poor.

The most important development of the industry in the past has been in the manufacture of utensils for household use. The domestic utensils, from the big water jars to the rice plates, cups and tubs of various shapes and sizes made of brass or bell-metal were manufactured by these cottage workers.

There are many places in Bengal where the industry at one time flourished, but now in competition with aluminium

and enamel articles its products are fast giving way. The Department of Industries, Bengal, has investigated into the causes of this steady decline of the industry and is definitely of opinion that the only way to arrest the present rate of decay and to revitalise it is to place the industry on an altogether new footing by introducing cheaper raw materials and labour-saving devices with a view to reduce the drudgery of labour and thus helping to bring the cost of production down to a level which will be in conformity with the diminished purchasing power of the householder.

The Department of Industries, Bengal, has carried out valuable experiments and researches with a view to find out an altogether new alloy which is now known as the New Bell-metal. This new alloy maintains all the distinctive elements of the old alloy, *viz.*, quality, colour, durability, etc., and is at the same time considerably cheaper in cost and lighter in specific gravity. The introduction of labour-saving devices with new processes of manufacture such as the improved method of melting the alloy with a new type of blowing arrangement will go a long way in revitalising the industry which at one time was the pride and glory of Bengal.

According to the latest Census Report a very large number of workmen are engaged in this line and their economic condition and general welfare are matters of such importance that they can hardly be left out of an economic planning in relation to the development of industries.

Places most famous for brass and bell-metal plates, etc. in the Burdwan district are Dainhat, Begunkola, Purbasthali, Chupi, Jabui, Sahera Bazar, Dignagar, Kaitara, Boupas, Karampur. In the Birbhum district the important seats are Nalhati and Dubrajpur. It is one of the important industries of the Bankura district where about 200 braziers work at Patrasayar and about 200 families each employing three persons on an average live by this industry at Bishnupur. The wares manufactured at Bishnupur are preferred for their superior polish and make and find a ready market. In the Midnapur district, of all the places where this industry is carried on, Kharar is

the only place where there is any organisation. "There are about 100 *mahajans* in the village, every one having a workshop of his own. Some of these shops employ as many as 70 to 80 workmen. There is a division of labour". In the Hooghly district the important centres are Gholsara, Bansbaria, Bally and Dewanganj. In Gholsara about 37 families manufacture brass fittings and jingles (*ghungurs*), while at Bally and Dewanganj in the Arambagh subdivision about 300 families of Kansari and other castes are always at work, the workmen being recruited from the castes of Bagdis, Duleys, etc. In the Howrah district Kalyanpur and in the 24-Pergunnahs Basirhat and Baduria are well known for the wares. Calcutta, of course is a large centre of the industry and a big trade centre too. In the Nadia district Meherpur and Kustia produce ordinary utensils while the most important centres are Matiari, Dharmada, Sadhanpara, Nabadwip, Bahirgahi, Sarak, Ranaghat and Faridpur. It is said that about 25,000 maunds of utensils are manufactured annually at Matiari and Nabadwip. Khagra in the Murshidabad district has eclipsed all other places. In the Dacca district there are important centres like Brahman-gaon, Dhankuria, Lohagunj, Firingibazar, Abdullapur, Sholanghur, and Dhamrai, while in the Mymensingh district Islampur is famous for its bell-metal utensils and Kagmari and Magra export every year articles worth Rs. 50,000 to Rs. 1,00,000. The chief centres in the Faridpur district are near Palong. The centres in the Tippera district are Brahmanbaria, Ramchandrapur, Maijpara, Betgarh, Pandhan-Khanbazar, Mogra, Badurgarh. In the Malda district Englishbazar, Kaligram, Kansharipara, Sankerbati, etc. produce a considerable quantity of articles. The industry has a centre at Budhpara in the Rajshahi district and Noakhali also has some centres.

One of the chief reasons of the decay of the industry is the depredation of the *mahajan* who is often a necessary evil. About the Bishnupur workers it is stated that they are "controlled by *mahajans*, who supply them with raw materials and take the finished goods from them allowing them a certain wage (called *bani* locally) on each article. They are kept in such

ignorance that some of them do not even know the current prices of the goods they make". In the Midnapur district "the *mahajans* are very rich and thrive upon what is really a sweated industry".

If the industry is to expand and occupy the position it did in bygone times it is obvious that the ramifications of its manufacture must necessarily increase. Mere production of utensils for domestic use only will not help us to achieve the end. The import figures of Bengal show that a large variety of brass articles such as household fittings, sanitary fittings, e.g., door knobs, handles, paper weights, wall racks, etc. are annually imported into the Province. The Department of Industries has standardised the manufacture of most of these articles and young men are coming in large numbers to avail themselves of the training given with a view to start their own factories and thus make a living.

It, therefore, follows that the development of the brass and bell-metal industry in Bengal must take into account the progress in both directions, *viz.*, the economic improvement of the existing workers as well as the attraction of educated "bhadrak" youths to the trade so as to enable them to open out new lines of manufacture described above.

Thus in the case of the existing cottage workers the only feasible way to vitalise them is to establish co-operative societies in areas where a large number of brass and bell-metal workers are localised and thus make them use improved machinery, purchase raw materials at bulk rates, dispose of their finished products at the maximum possible value.

As in the case of other cottage industries previously described, we suggest the establishment of trade schools in these areas so that adult workers as well as their children may take full advantage of the improved method of training which will benefit them materially. Such trade schools, in our opinion, if established in areas of brass and bell-metal workers, should be affiliated to district trade schools where young men of the "bhadrak" community together with the cottage workers, who give indication of a more progressive assimilation of knowledge

and who are more advanced than their fellow workers of the locality, can simultaneously be trained in the improved methods of manufacture. The distinctive feature of the training imparted in the District Trade Schools and the local Trade Schools will lie in the nature and method of training imparted ; that is, in the case of the District Schools the training will be of a more advanced type than that in the local Trade Schools. Each District Trade School should have a small museum attached to it where various types of brass and bell-metal articles that are actually sold in the district would be exhibited.

The Trade School authorities will analyse the cost of production of these articles and see how far and to what extent the manufacture of these articles can be made an economic proposition in the district. It will be for the authorities of such District Schools to select the manufacture of such of the commodities in the local Trade Schools as, in their opinion would be paying. The Schools will be associated with the co-operative societies established in places where a colony of workers exist.

This is merely an outline of the development programme of the brass and bell-metal industry.

A scheme for brass and bell-metal factory, if run as a cottage industry, is given below. It has been drawn up in a manner so as to be of special use to those who are already engaged in this industry.

A scheme for a Trade School can be drawn up ; but its estimate of cost both in regard to capital charges and running expenses will vary according to the number of students to be trained which again will depend on the area *where* the school will be established.

A tentative scheme of Brass and Bell-metal factory on a cottage industry scale is given below :

Rs. A. Rs. A.

(A) *Capital charges*

(1) Erection of suitable workshop shed ...	100 0
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	Rs. A.	Rs. A.
(2) Machinery :—		
(a) Prime mover, oil engine, 1½ B.H.D.		
• Kerosene oil engine (hopper cooled)	250	0
(b) Polishing Lathe 36" long only one	40	0
Erection charges of the above machine	10	0
(c) Hand Blower for melting furnace (country made)	15	0
(d) Fitter's Equipment		
(i) Fitter's working table of teak-wood with drawer ...	15	0
(ii) Fitter's handy tools—table vice, hand drilling machine hammer, stocks and dies, hacksaw frames, chisels, spanners, etc.	75	0
(e) Moulder's equipment—		
Sheet metal moulding frames 1 dozen pair assorted cast iron moulding boxes 1 dozen pair (assorted) cleaner, crucible tongs, tongs, rammers, clamps ladles, etc. ...	65	0
(f) Melting furnaces 3 only ...	10	0
(g) Patterns (wooden and metallic) ...	20	0
(h) Stores, service and supply—		
Wooden rulers, inside and outside callipers, taps and dies, shovel, stove, soldering iron, glue pot, emery dresser, drill bits, belting, fastener, weighing balance, emery stones, oil sand, moulding sand, calico mops, felt bobs finishing mops, grease, crude oil, files, hacksaw, blades, stationery and storeroom boxes, furniture, etc. ...	100	0

	Rs.	A.	Rs.	A.
(B) Capital charges				
(1) Depreciation at $7\frac{1}{2}$ per cent. per annum on capital expenditure of				
Rs. 700	53	0		
(2) Interest at 5% for Rs. 700 ...	35	0		
(3) Repair at 1%	7	0		
	Rs.	95	0	
Daily ...			0	6
(C) Running Charges (Daily)—				
(a) For oil engine				
(i) Fuel for the engine, (ii) Lubricating oil for the engine			1	0
(b) Raw materials—				
Copper, zinc, tin, lead, aluminium, brass scrap, nickel, bell-metal scrap, gunmetal scrap, etc., for 1 md. casting			18	0
(c) Moulder's consumables				
Hard coke, steam coal, fuel wood, kerosine oil, plumbago, graphite, core sand, jute, charcoal, etc. ...			0	12
(d) Polisher's consumables—				
Lustre bar, rouge compo., glue, chalk powder, etc.			0	6
(e) Labour charges (Productive)				
(i) Moulder—I			1	8
(ii) Polisher—I			1	4
(iii) Fitter—I			1	0
(iv) Workmen labour—I			0	12
(v) Cooly—I			0	8
(vi) Supervisor (technical man) ...			2	8
Total daily expenditure			28	0
Sales commission @ 5%			1	8
			29	8

	Rs. A.	Rs. A.
By sale of 28 seers of finished products of brass, bell-metal, aluminium articles etc. @ Re. 1-4 per seer wholesale rate		Rs. 35 daily
Net profit @ 20% approx.	...	Rs. 5-8 daily

Iron and Steel Industry

CUTLERY

Iron was extensively used in Bengal ever since the dawn of history not only for articles of domestic use but also for weapons, offensive and defensive.

Mr. Watson, the author of '*A Monograph on Iron and Steel in the Province of Bengal*' has mentioned one weapon in actual existence which is supposed to have been made before the Christian era. This is a spear or a lance which belongs to the Nawab of Murshidabad. It is made of beautifully tempered steel inlaid with gold and bears on the blade the image of Vishnu on the one side and that of Garud on the other. "The character of the ornamentation on the blade bears very marked resemblance to much of the carving and ornamental work on the Orissan temples". Guns of huge size were also made in Bengal. The *Bachawali tope* which is still to be seen at Murshidabad is supposed to have been made between the twelfth and the fourteenth centuries and consists of two pieces of different diameters, the smaller portion, which is the chamber, being 3 ft. and 7 inches long with a girth of 4 ft. and 4 inches. "Eleven rings bind the wrought iron barrel, the inner surface of which bears ample evidence of the gun's great antiquity". Mr. Watson says that the gun is a most curious article. "It is, so far as I am aware, the only breach-loading gun ever attempted until quite recent times". Another big gun, also at Murshidabad, is known as the *Jahan Kosha* and is made of iron. It bears an inscription to the effect that it was manufactured at Jahangir Nagar i.e., Dacca by Janardan Karmokar in 1637 A.D. The age of the famous gun *Dalmardan* at Bishnupur (Bankura) cannot be ascertained with certainty but

it is also very old and testifies to the skill of the Bengalees in using iron.

"The weapons of the eighteenth century are better known, as many specimens are preserved. In the palace of the Maharaja of Burdwan there are weapons of this period of which the exact history is known. In the village of Kamarpara (the quarter in which the blacksmiths live) eight miles from Burdwan, there live many smiths who made all the arms for the Raj. There is a sword in the possession of the Maharaja, of which the following story is told. A smith from Kamarpara brought this sword for sale to the Raja (the warrior Raja, the father of Raja Chitra Sen Roy, who reigned about 1700) but asked such a high price that he was ridiculed and dismissed. On going out from the palace he chopped through with one stroke of his sword the trunk of a large tree which stood near the gateway of the palace, but cut it in such a way that the tree remained standing. In a few days the tree began to wither and die. On making enquiries the Raja discovered the reason of the tree's withering and purchased the sword from the smith at the original price asked".

There are old matchlock guns in the palace which were made at Kamarpara and used in a battle in 1761 by the army of Maharaja Tilokchand Bahadur against the English under Captain Martin White. The smiths of Burdwan made swords also for the Nawabs of Bengal and it appears that some of them came from Burdwan to settle near the Moslem Court at Murshidabad.

In the armoury of the Nawab Bahadur of Murshidabad are many old weapons made in Bengal and these were undoubtedly manufactured in the Province after the pattern of Arabian, Persian and Punjab arms.

The story of the Burdwan sword reminds one of the famous Damascus blades which were tempered in India.

There were undoubtedly many other places where arms were manufactured in Bengal; Protapnagar (in the district of Khulna), for instance, is known to have been the home of smiths who manufactured all the guns and implements of war

required by Raja Pratapaditya, who flourished in the first half of the 17th century.

Birdwood makes especial mention of the Chittagong *dao* or bill and the *Kukri* of the Gurkhas of Nepal.

The industry is not thriving ; but the village blacksmith's services are requisitioned for manufacturing the plough-share, the fish-knife, the knife for preparing vegetables for the kitchen, the *dao* or bill, the scythe, the nut-cutter, the *dhuni* used for irrigating the fields in Burdwan, the tongs, the *tawa*, etc. The hand-made spade has been replaced by the cast-iron spade and the cooking utensils also are now mostly of cast-iron. The following figures taken from the latest census report show the depressed condition of the industry in Bengal :

Worker	Earners Principal occupation and working dependents.	Earners Subsidiary occupation
Smelting, forging and rolling of iron and other metals ...	1,736	68
Makers of arms, guns etc. ...	271	15
Blacksmiths and other workers in iron and workers of imple- ments ...	38,731	4,112

Cutlery is an important branch of this industry. The cutler requires the usual hearth, bellows, anvils, hammers, tongs, and chisels, and in addition he requires water for tempering his blades vice, file, drills, grindstone and polishing wheels.

Customs returns go to show that in the matter of her requirements regarding cutlery products Bengal depends to a very large extent on supplies from foreign countries. But the cutlery industry is capable of rapid expansion if developed either as a cottage or as a small industry. Only the development must be on proper business lines and improved methods of manufacture should be adopted. Doubts have often been expressed even in well informed and responsible quarters, about

this particular type of manufacture proving successful as a cottage or a small scale industry having due regard to quality and price. But recent experiments conducted and successfully concluded at the Industrial Research Laboratory attached to the Department of Industries, Bengal, in matters of annealing, hardening and tempering have opened out the possibilities of the development of the industry even on a small scale. The various handicaps under which the industry had to work in the past, specially in the processes mentioned above, have been successfully removed and the products of the indigenous industry can now compete in quality, price and finish with imported goods.

The articles mostly in demand but supplied chiefly by imports from foreign countries can be conveniently classified under four major heads or groups :

- (1) (a) Knife ; (b) Scissors grup.
- (2) Surgical instrument group.
- (3) Razor group.
- (4) Miscellaneous group.

Under (1) (a) pen-knives, table knives, pruning knives, butcher's knives, bread knives, office knives, etc., are regarded as important articles which are readily sold ; while under (b) fall tailor's scissors, barber's scissors, garden scissors, etc.

Under (2) fall various instruments such as scissors, lancets, scalpel, forceps, etc.

Under (3) come various types of razors, cheap, moderately priced and expensive.

Under (4) the *daos*, spatula, etc.

The manufacture of cutlery products belonging to groups 1 and 4 can now be carried on economically even as a cottage industry.

Below is given a list of equipments for a small cottage factory for the production of articles of groups 1 and 4.

- | | |
|--|---------|
| (1) Prime mover, <i>e.g.</i> , an electric motor or
oil engine $1\frac{1}{2}$ H.P. | Rs. 300 |
| (2) Two grinding and one polishing
machines | „ 300 |

(3) Bench drill, vice, hand saw, blower, hammers, hacksaw, etc. ...	„	300
(4) Furniture, etc. ...	„	100

To these should be added the cost of :

Transmission ...	„	200
Foundation and erection charges ...	„	100

Rs. 1,300

The following figures taken from the books of a cutlery factory actually working in Kidderpore (Calcutta) must be found interesting :

To manufacture 200 dozens of pen-knives the details of expenditure are :

	Rs.	A.
(a) Scrap steel (240 lbs.) ...	15	0
(b) Brass sheets for collars (80 lbs.)	25	0
(c) Labour for cutting, including cost of dies ...	65	0
(d) Charcoal ...	2	8
(e) Horn for handles (120 lbs.) ...	15	0
(f) Tin and lead ...	2	0
(g) Brass wire (2 lbs.) ...	1	0
(h) Stone powder etc. ...	10	0
(i) Packing paper, oil, glue, cooly ...	5	0
(j) Files (flat type 4, triangular type 4 and round type 4) ...	6	0
(k) Fitting labour at -/6/- per doz. ...	75	0
(l) Labour at -/6/- per doz. ...	75	0
(m) Soldering, stamping, tempering ...	15	0
(n) House rent and cost of current or power ...	40	0
(o) Depreciation charges ...	10	0
(p) Interest ...	5	0

Total Rs. 371 8

Thus the cost for the production of 200 dozens of pen-knives comes up to about Rs. 375/- the cost per dozen being Re. 1/14.

It will be found that the cost of labour forms a very important item in the manufacture of cutlery, indeed it is more than half the total cost. Every endeavour should be made to keep as much of it in the family as possible. If members of the family take part in the manufacture much of the labour charges will swell the family fund.

Costing charts, of the articles which fall under the different groups have been prepared after careful investigation and experiments, and are available at the office of the Director of Industries, Bengal. One factory for the manufacture of products under group I and another for the products under group III can be successfully run in every district town where there is a large number of inhabitants belonging to the middle classes. It is also possible to run a factory successfully at each sub-divisional head-quarter for goods included in group I. Thus in the 112 sub-divisional head-quarters there can be run 112 factories producing knives and scissors for local consumption and in the 27 district towns can be run 27 razor factories.

The prospects of factories established for the manufacture of articles included in group II, i.e., surgical instruments will be discussed under big industries.

We now turn to the neglected but important articles under group IV. They may be classified as follows :

(1) Agricultural implements, tools etc., such as the iron tip for the share of the plough, the axle and washers etc., of the bullock cart, the *khonta* for digging holes, etc., the *káste* for grass cutting, the *dao*, the fish knife, etc.,

(2) Cooking utensils and other articles of domestic use, water vessels, etc.,

(3) Tools and other articles used in various handicrafts and professions such as the hammer (*haturi*), the axe (*kurali*), nails, anchors, chain, trowels, etc.

(4) Weapons such as large knives for sacrificial purposes, etc.

In the summary of the Cottage Industries in the Districts of Bengal it is found that in almost every important village there were smiths who produced articles to meet local requirements. But the latest reports are discouraging. To improve the industries improved methods of manufacture and the use of mechanical contrivances, etc., should be introduced. The best and easiest means to accomplish it is to arrange for ocular demonstrations at the seats of the indigenous industry, *i.e.*, in the villages where the smiths are still working and have a reputation built up on experience. Attention is invited to the chapter under technical education where this aspect of the question has been fully discussed. Below is given the names of the important centres in the districts of Bengal :

(1) BURDWAN—Kanchannagar, a suburban area of the Burdwan town has long been famous for the cutlery industry—the smiths maintaining to some extent the tradition of the Kamarpara smiths. At present there are about 15 families of smiths carrying on the industry. There are 8 small factories, some of them employing about 24 workmen and one factory is fitted up with oil engine.

(2) BIRBHUM—In some villages iron fittings for agricultural use and other implements are made by local blacksmiths for local use.

(3) BANKURA—Shahaspur is the village famous for its cutlery. About 15 families are engaged in the industry at present and make pen-knives, razors and scissors of good quality. But the industry has been declining owing chiefly to foreign competition and does not attract new recruits to be properly trained to become skilled in the work. "The salvation of the industry appears to lie in the introduction of improved and up-to-date machinery so as to save labour and to lessen the cost of production".

(4) NADIA—Barbakpur and Hogalbaria in the Meherpur sub-division where the blacksmiths prepare knives, scissors and padlocks.

(5) KHULNA—Villages within the jurisdiction of the thanas Kaligunj and Shamnagar where *daos*, scissors, nut-

crackers, sacrificial knives, etc. are still made, though not of the same quality as before.

(6) DACCA—The Manufacture of iron implements and tools is carried on on a comparatively large scale within the jurisdiction of Srinagar Police station in the Munshigunj sub-division as also in the following villages :—

Sadar Sub-division—Kadamtali, Subhadya, Mushankhola, Gowhat, Dhamrai, Srifaltali, Ramnagar, Bakshannagar, Gobindapur, Dekra and Rohitpur.

Manickgunj sub-division—Safulli, Kayannera, Kazikola, Doulatpur, Jhitka, Lesragunj, Boyra and Sutarari.

Narayangunj sub-division—Pranakardi, Mahahardi and Cotasi.

Munshigunj sub-division—Bahar, Firingibazar, Autshahi, Kandapara, Kakuatia, Madhyapara, Kakootali, Kola, Rauthbhog, Ichhapura, Srinagar and Kalikal.

About 200 men in Manikgunj sub-division and about 300 in the sadar subdivision are engaged in the industry.

(7) MYMENSINGH—Blacksmith's shops are scattered all over the district. *Daos* of superior polish and finish are made in some villages in the Kishoregunj sub-division.

(8) BACKERGANJ—High class cutlery is made at Uzirpur and Barapaika and the blacksmiths of Patuakhali and Nalchiti also make quite good cutlery. Special saws for cutting conch-shells are made at Uzirpur. There are about 6 families employed in this work alone.

(9) CHITTAGONG—In various villages the blacksmiths manufacture agricultural implements and domestic articles while some of them also manufacture bolts, nuts, etc.

(10) TIPPERA—In the Sadar sub-division and in Brahmanberia there are blacksmiths who manufacture high class *daos*, fishknives, pruning knives, spades, etc. ; some blacksmiths of Medda and Ramchandrapur manufacture high class cutlery.

(11) NOAKHALI—The Blacksmiths of Dattapara are famous for their skill in manufacturing cutlery decorated with brass ornamentation. In Noakhali town some blacksmiths make bolts and nuts and do ordinary repair work

(12) DINAJPUR—Patnitala, Kotwali, Porsha and Raigunj are the principal centres of the industry.

(13) DARJEELING—There is a Khukri factory at Ghoom which employs about 10 workers. The Khukris are sold locally and are also supplied to the Military Departments all over India.

Button Industry

The increasing importance of the button industry for India will be apparent from the fact that the value of the button imported from Germany has been as follows :

Year			In thousand of rupees
1930-31	...	...	323
1931-32	...	...	270
1932-33	...	...	423

while the value of imports from Japan has been as follows :

Year			In thousand of rupees
1930-31	...	...	536
1931-32	...	...	424
1932-33	...	...	724

Bengal, like the other Provinces, depends chiefly on foreign imports for her buttons. These buttons are made from a large variety of materials of which the most important are

- (a) Galalites (synthetic product from casein)
- (b) Corozo (a plant grown in South America)
- (c) Ivory
- (d) Metals (aluminium, brass and copper)
- (e) Mother-of-pearl
- (f) Horn
- (g) Bone

Except Corozo and Galalites (the latter can be produced in Bengal as easily as elsewhere) the raw materials for the

manufacture of all other kinds of button are easily available in Bengal.

Mother-of-pearl buttons.

Bengal affords natural facilities for development of mother-of-pearl button industry. A reference to the Report on the survey of Cottage Industries would go to show that the importance of this industry is almost negligible, as

(1) The manufacture of comb, button, brooches and other ornaments from mother-of-pearl and oyster shell at Chaugachi (in Magura sub-division, Jessore) is still carried on in a small way.

(2) Buttons are made from mother-of-pearl shells in many of the villages of Tipperah, specially at Ramcharanpur and Ranidia in the Brahmanberia sub-division This industry is not flourishing.

(3) Buttons were formerly made in Durgapur (Noakhali district). The industry has now disappeared.

(4) The manufacture of mother-of-pearl buttons is another important cottage industry of the district of Dacca. There are about 50 people who make these buttons at home in the villages of Narinda, Faridabad, Ekrampur and Sutrapur. The chief place of business, however, is at Nangabad and the principal villages where these shell buttons are manufactured are situated within a short distance from each other in the Narayangunj sub-division. In villages Nangabad, Kamargaon, Jindharia, Tejpur, Madhabpassa, Kaelhatta, Malikpara, Kairtala and Barapara a large number of people are employed in the manufacture of buttons. At these villages buttons of various kinds are manufactured and men, women and children work at them. The men merely cut out suitable pieces from the shell and the rest of the work is done by the women. Besides the above, there are a large number of amateurs who make out buttons during their spare time. These cottage workers thus supplement their income by making buttons.

The district of Dacca, therefore, is the only important centre of the industry. But though the industry has assumed

some importance since its establishment a few years back the workers are hardly prosperous. The Director of Contracts had occasion to express the opinion that on account of the unstandardised nature of their finished product and failure to supply the stipulated quantity of goods in time it becomes difficult for him to place orders with the Dacca button makers. These deficiencies result in the workers being compelled to remain satisfied with a very limited market. Unless the quality of the products is improved and the buttons are standardised very little can be done. And this means organisation.

The story of the establishment of the industry is interesting. It was told by Mr. T. Southwell, Director of Fisheries in a lecture at Patna in 1916 :

“The utilisation of the shell for making pearl buttons is of quite recent origin and is due in a large measure to the initiative of a certain Babu Shyama Churn. This gentleman . . . when asked to tell his story, stated that he started life as a professional clown in a *Jatra* or theatrical party. On one occasion the party performed at Comilla. Here he found some very large shells. He purchased a number for six pies. He knew that shirt buttons are manufactured elsewhere from shells, and he thought that the shells he obtained at Comilla could be used for the same purpose. Having no other instrument he used an ordinary *dao* to cut the shells into small roughly circular pieces. The irregular edges were ground off with a muller (stone roller). An ordinary . . coin was employed for marking out circular pieces of the shell. The holes were made by means of a needle made fast into a wooden handle. The shells being clean and almost white in colour, required no polishing. He kept the buttons he had made and prepared more from time to time. One day the *Jatra* party went to perform at the palace of Raja of Joydebpur (Bhowal). When the Raja saw the buttons he purchased them for Re. 1/4/-. Thus by working in his leisure hours and with raw materials which only cost six pies Babu Shyama Churn found that

he could earn Re. 1/4/- in a short time. He then started work in earnest and accordingly gave up the profession of a clown from which he only earned Rs. 10/- per mensem. This happened thirty five years ago. He was henceforth able to earn a good living by manufacturing buttons. At the height of the swadeshi movement his income from the sale of the buttons was very considerable. At that time he was working at Dacca, at which place other men, with more capital than he had, joined him and started a 'factory'. Large numbers of men from Barapara and other villages in the district of Dacca also came and worked in the 'factory' and thus learned the work. These workmen eventually spread all over Bengal, and as all castes are allowed to engage in button making the practice soon became wide spread".

A similar story could be told of the Moon Button Factory of Mehshi (Champaran in Behar) which worked mainly with shells from the Gandak river.

The Report on the working of the Department of Fisheries in the Punjab for the period June, 1915 to May, 1916 contained some interesting information in regard to the possible prospects of the trade in buttons made of mussel shells in the Province. Specimens were sent to America for opinion. An ambitious proposal was made to breed the proper variety of mussels or to introduce exotic species. But it was too ambitious to be successful under existing circumstances.

As it is, the market for mother-of-pearl buttons manufactured by cottage workers in their crude method can be extended if the products are made of uniform quality.

But the complete process of button manufacture consists of six different processes which are

- (a) Blanking
- (b) Grinding
- (c) Facing

(d) Drilling

(e) Smoothing

(f) Colouring.

It has to be considered if all these six processes can be carried out conveniently and profitably by hand operation. Button experts are of opinion that operations (b), (e) and (f) can be done by hand while for (a), (c) and (d) machines are more convenient. The problem of button manufacture, therefore, can be divided into two separate treatments, one requiring the help of up-to-date machinery and the other easily lending itself to hand power. Having due regard to the fact that an average cottage worker works on a small scale, and he cannot command anything but a small capital and that a power operated machine is comparatively costly and must have a minimum output for efficient working, it stands to reason that either a co-operative society should be formed amongst the workers who will jointly instal the necessary machinery as was done by the Irish peasants producing dairy product or there must be individual capitalists who will undertake the work of distributing raw materials to the workers who will bring the buttons to them in an unfinished condition to be finally finished off by machinery for a small charge. The introduction of labour saving devices is of primary importance, as without reduction of labour charges the cost of production cannot be reduced to any appreciable extent nor can the quality of the buttons be improved.

The scheme for setting up machinery will come under small industries.

Metal Buttons.

These are manufactured practically in Dacca only. As they are best made by machinery the factory and not the cottage is its proper place.

Horn Buttons.

There are about 100 people engaged in manufacturing buttons from horn at the following places of Dacca city, *e.g.*,

Choudhuribazar, Amligola and Nawabgunj. The buttons are made from the solid portions of the horn. They use practically no machinery. The buttons are well made, but there is very little demand for them.

But India is the only country in the world where suitable materials for the manufacture of horn buttons are found. The horns available here show such characteristic signs and depth of colour as are not found in horns of any other country. So there is sure to be a demand for these buttons not only in the country but also outside it. The Bengal products ought to command a ready sale in the Province first and beyond its borders afterwards. Every year we import large consignments of these buttons although the Province is well provided with raw materials to meet the demand. Needless to say polishing and finishing may be better and quicker done by machinery, and if machinery is set up on the same principle as suggested in the case of mother-of-pearl buttons the business will thrive.

With materials ready the manufacture of buttons can be developed within a very short time.

And researches and experiments can be undertaken to produce in Bengal galalite which should not take a long time.

The development of the button industry will prevent large sums of money from going out of the Province annually and will also open up a new avenue for drawing money into it.

A modest scheme for running a button factory on co-operative lines is given below :

A. Machine required :—		£.	s.	d.	£.	s.	d.
1.	3 Blanking machines @						
	£25-3s. ...	...	75	9	0		
2.	3 Facing machines @						
	£22-16s. ...	...	68	8	0		
3.	1 Drilling machine	...	100	0	0		
			<hr/>			243	17 0
			243		17	0	

B. Tools and accessories required :	£.	s.	d.	£.	s.	d.
12 Crown Drills @ 11s. 3d. ...	6	15	0			
12 Button facing tools @						
7s.-8d. ...	4	12	0			
100 Drill tip 1 1/3 size ...	0	5	6			
1 Lift eccentric ring for 4 holes	0	10	11			
Ditto. 2 holes	0	18	0			
12 Hand tongs to hold shells						
against blanking operation	2	0	0			
3 sets of 4 different sizes @ 15s	3	0	0			
				18	1	5
	18	1	5			
Total of A & B say ...				262	0	0
C. Add 10% for insurance,						
freights and duty which						
amounts to ...				26	0	0
				288	0	0
Exchange generally fluctuates				Rs.	A.	P.
between Rs. 13/4/- and						
Rs. 13/8/- and so it will						
be safe to calculate on the						
basis of Rs. 13/8/- ...				3,900	0	0
D. Erection including, shafting,						
bearings, pulleys, couplings				1,350	0	0
E. Engine 4 B.H.P. ...				500	0	0
F. Buildings 360 sq. ft. @ Rs. 4/-						
per sq. ft. ...				1,440	0	0
				7,190	0	0

Outturn of the machines

It is estimated that the outturn of these machines will be 90 gross a day on the assumption of a 10 hours working day.

which brings the figure to Rs. 8/- per day. Monthly profit (for 25 working days) . Rs. 200/-. Yearly profit is Rs. 2,400/- say Rs. 2,000/- after deducting interest on Rs. 8,000/-. In four years's time the full value will be realised.

The Toy Industry

The importance of the toy industry is oftener than not under-estimated in India. But an examination of import and export figures shows how every year we are sending abroad lakhs of rupees for toys. Before the present economic depression set in the first ten months of a financial year saw the import into India of toys worth over 53 lakhs of rupees against about 2½ lakhs of rupees of Indian toys exported abroad. "There is hardly any power-driven toy factory in India and consequently the outturn is so poor". Timber, metal, prepared earth are the principal basic materials of this industry in India to which celluloid and other chemical products are being slowly added. Lac-dyed wooden toys are favoured not only in India but also in Europe, and Russia sends to England these toys worth thousands of rupees every year. But here, the race of hand-turner is dying out for want of encouragement. Soft, long-grained, tight timber is required for these toys and trees producing such timber are now seldom grown. And even if the timber be available at higher cost, "the niceties of subtly turning coloured shellac around the wooden pattern require master strokes of hand over the turning instrument". This dyeing work is peculiarly Indian and is not suitable for mass production from a factory. It is the product of the cottage industry. Therefore the hereditary instinct of a craftsman is essential to keep alive the dying lac-dye toys. The present high cost of production can be reduced very considerably by the use of improved machinery. The installation of such machinery is costly and would require the attention of educated youths in search of occupation. There must also be secured an extensive market, the organisation of which demands an

assiduity, intelligence and influence here and abroad which have to be cultivated carefully.

In Bengal a high state of ceramic industry existed in the past and gave sustenance to a section of the Hindu community and in this line of toys the workers of Krishnagar (Nadia) excelled above all. But their work of art can hardly compete with the foreign potteries which are pouring out machine-turned cheap products to Bengal.

In the line of metallic toys we are now almost nowhere due to extensive German and Japanese competition. The metallurgy and sheeting industry have reached such a fine position in Germany that it can turn out sheets of very fine gauges by first class plants. Helped by this excellent provision for basic materials a systematic study of tastes prevailing in different parts of India and other countries coupled with the adaptability of German craftsmen has produced in Germany an industry which now commands the world market. In 1925—after the pauperisation of the Germans due to the War and the scarcity of money and credit—Germany made a rapid stride and the *Quality Market* published from Leipzig had the boldness to declare, "Like a threatening mountain the Germans have before them the burdens imposed on German business by the Dawes Report, but the German Toy Industry does not need to fear the future and the fight it will bring. Through quick and steady work it will always try to cultivate the warmth and heartiness of the German toy as an expression of the German national character while furthering the quality of its products still more".

There were two kinds of toys in which Bengal excelled, the clay toys of Krishnagar and the lac toys of Illambazar (Birbhum); at one time about 200 families were engaged in this business.

We shall take the clay toys first. No Indian festival, feast or fair would be complete without the gaudy brittle stalls of clay toys. Elephants, tigers and all the beasts of the field can be found made by clever craftsmen. The clay models of fruits

and nuts are excellently made and coloured with an artist's hand and eye and have often been taken for real fruits and nuts.

But to-day we import in large quantities. The figures of import from Japan are :

	In thousand of rupees
Pre-war average	3,16
1930-31	13,10
1932-33	22,86
Coming from Germany we find :	
	In thousand of rupees
1932-33	3,84

Thus we are importing large quantities of toys which can be produced by us in this country and, perhaps, made and sold at a cheaper price. As in the case of toys made here we will have the advantage of cheaper labour and will also be able to avoid freight and duty, factors so helpful in keeping down prices of articles.

Tin toys sold in the bazars of Bengal used to be imported chiefly from Great Britain, America and Germany in the past and are now imported more largely from Japan. That Bengal provides a good market for these toys goes without saying and there is no reason why they should not be manufactured here.

These articles are made of tin scrappings which are easily available. The main difficulty lies in printing and colouring. Before the introduction of spray painting plants painting used to have been done by brushes resulting in undue wastage of paint and time. Many spray painting factories having been started in various places in Bengal the prospects of manufacturing tin toys even as a cottage industry in these places are bright. But unfortunately no systematic attempt has been made to organise the manufacture of tin toys even when both the raw materials and the market are at hand.

There are generally two types of tin toys in the market—those with the spring arrangement and those without it. The

toys without any spring arrangement are known as plain toys and their cost of production is very small. Cheapness being the criterion of sale in the market it will pay to manufacture plain toys. These toys are made out of tin scrapings and as no printing is necessary painting can be done with the help of the brush.

To manufacture these plain toys the machinery required are two or three different types of screwpresses, the designs of which can be supplied by the Department of Industries, Bengal.

On an average, each screw press will turn out about 4,000 pieces in the course of a working day of 8 hours. Along with the presses different types of dies and matrices are necessary because a complete toy consists of two to four different pieces of tin pressings necessitating the use of different dies and matrices. While a big factory should be equipped with a manufacturing department of dies and matrices, for a cottage factory it would be more convenient and less costly to get them manufactured by specialists in the market.

The names and addresses of dealers in machinery, stockists of tin and colours, manufacturers of dies and matrices are also available from the Department of Industries.

At the end of the section is given a list of tools, etc. required for a tin-toy factory.

As has been said before, tin toys are not the only toys that sell in the market. Toys of clay, China clay, wood and lac are found in abundance. Of the four, the lac toys had been the specialties. But an attempt is being made by the Viswabharati (Surul) to revive the industry. It certainly deserves revival.

Krishnagar clay figures, etc., are works of art, and there is no reason why they should not be used in preference to uncouth toys imported from Japan which offend the artistic sense which should be carefully cultivated. Sincerity, as Lord Leighton said at the first meeting of the Society for the Encouragement and Preservation of Indian Art in 1891, is the

true element of life in art. These imported toys lack sincerity. Years back the Calcutta Potteries produced some China clay figures from moulds made by Krishnagar craftsmen, and they were excellent examples of what such toys could be and should be. No art can flourish if the national sentiment is not in it. To find the causes which have led to the decay of Indian Art we must, therefore, investigate reasons for their decadence of popular taste. Various reasons have contributed to it ; and as Mr. Havel has pointed out the Government should be convinced, before it is too late, that it lies in their power to arrest, to some extent at least, the mischief which has already been done. As an example he said,

“Not many years ago, a number of important buildings were being erected in Calcutta, and for their external decoration terra-cotta to the value of a lakh of rupees was obtained from England. This terra-cotta was not of exceptional artistic merit, to set an example to the Bengalee artisan, but the ordinary commercial ornament which is sold by the square yard by European manufacturers. Now, Bengal is a great brick-making country, and there once existed a beautiful art in moulded brick-work, still to be seen in old buildings in many parts of the Province. If a lakh of rupees had been spent in reviving this decayed art, public buildings in Calcutta would have had far better ornaments and an old industry might have revived.”

This culture of taste should be undertaken by the people. *These toys* are real works of art. They will help to cultivate the taste in the children and also help a large number of people to earn a living.

The wooden toys can be produced cheaper by the use of improved machinery and appliances. The use of toys—clay, China clay, wooden, lac and tin—made in Bengal will prevent large sums of money being sent out of the Province to Japan, Germany and other countries. The development of this industry as a cottage industry should be attended to.

The following gives an approximate idea of the cost of tools and equipments necessary for opening a tin toy making factory :

	RS.	A.	P.
One big size Screw Press . . .	350	0	0
One medium size Screw Press ...	250	0	0
One small size Screw Press ...	200	0	0
One Turning and Wiring Machine ...	120	0	0
One Tinments snips, size 10" ...	2	12	0
One Tinsmiths wooden mallet, 5 × 2½ × 2"	2	10	0
One soldering iron ...	2	0	0
One Hammer, Concave, 2 lbs. ...	2	0	0
One Stakes, Extinguisher, 7 lbs. ...	7	0	0
One Wrench, size Leyn 15" Span 1½"	7	8	0
One Pliers, side cutting, size 6" ...	6	14	0
One Cutting Pincers ...	2	12	0
One Calipers, inside ...	2	0	0
One Hand Blower and Furnace ...	3	0	0
Cost of Dies and Matrices ...	500	0	0
Cost of furniture etc. ...	150	0	0
Cost of Tin scraps ...	150	0	0
Cost of Paints, brushes etc. ...	50	0	0
Cost of Soldering materials, etc. ...	25	0	0

Costing charts showing the cost of production of various types of toys are available in the office of the Department of Industries, Bengal.

Ceramics

From the dawn of civilisation the potter has been an indispensable adjunct of the village and an important member of the community. Cooked food requires pots and pans in which it has to be prepared ; and no house can be without such utensils. With the growth of the potter's art earthen jars have been used for drawing water and storing it in, and grain is stored in them. Various kinds and types of vessels have been evolved for various uses. And, as happens in a

well established civilisation, often these brittle things have not only been the things of utility but also of beauty.

The successive surveys of the cottage industries, however, revealed the fact that though almost every village still possesses its potters, they are no longer prosperous. The pottery articles prepared in the primitive method of manufacture can no longer hold their own against the influx of cheap, durable and attractive products imported from foreign countries and dumped in the markets of Bengal and India. It is only the conservative instinct of the vast Hindu population and the inability of foreigners to produce cheap substitutes for jars in use in connection with the *gur* and other industries that have saved the industry from further depression and ultimate extinction.

The only means to save the industry and those who are engaged in it is by revitalising the industry by over-hauling the entire process of manufacture so as to make the potters produce new types of articles now liked by the people with labour-saving equipments.

In order to introduce new processes of manufacture with a view to standardise the manufacture of at least some other articles that are now sold in large quantities in the market, such as articles of glazed pottery and majolica ware, it is necessary to introduce improvements not only in the equipment but also in the technical processes of manufacture. For instance, a proper type of the potter's wheel which will rotate uniformly for a comparatively long period so as to enable the potter to carry on the work of throwing of clay on the wheel to make tea-pots, tea-cups, flower-vases, etc., is necessary. Fortunately the Department of Industries, Bengal, has been successful in designing, constructing and perfecting a new type of wheel which though not operated by power has the same efficiency as that of a power operated wheel. This will be of considerable help to the potters not only in the industry as it is but also in future developments. The following extracts from a letter written by the management of a well-known pottery works of Calcutta to the Director of Industries,

regarding the working of the new wheel, will show to what extent it will be able to replace even the power operated wheel :

“We have worked the potter's wheel you kindly sent us for demonstration purposes and so far as we are able to judge it is well suited for all classes of work as is required in pottery ; its variable speed makes its sphere of usefulness more pronounced for small and large work and it is, therefore, a distinct improvement over our present wheels which only rotate at a given speed. We intend to adopt this pattern and by degrees eliminate our power driven wheels by doing which we estimate a saving of Rs. 200/- per month on our electricity bills.”

Next in importance to the wheel comes the kiln for baking. The success that has crowned the efforts of the Department in designing and in constructing a small type of kiln for firing articles of glazed pottery will go a long way to rehabilitate the once flourishing pottery industry, providing employment for lakhs of potters now in a state of stagnation. Such kilns are already in operation in various parts of Bengal, *e.g.*, Rajbari, Calcutta, Uttarpara, Serampore, Comilla, etc.

Articles of glazed pottery, *e.g.*, tea-pots, jars, toys, vases, etc. can now be successfully manufactured even in villages. The introduction of the new type of wheel together with the new kiln and the adoption of the new method of glazing have opened out immense possibilities for the pottery industry throughout Bengal, and it can be reasonably expected that within a short time every subdivision in Bengal will have several pottery works, not only producing articles which the inhabitants have to buy from outside but also creating facilities for the employment of hereditary potters traditionally skilled in certain branches of clayware making—particularly throwing of clay.

An approximate estimate of a cottage factory with improved wheel and kiln is given below.

(a) A Kiln with a shed	...	...	Rs. 125
(b) A small pot mill for grinding, glazing materials	...	...	„ 75
(c) A potter's wheel	...	...	„ 70
(d) Tools and appliances etc.	...	...	„ 50
(e) Transport etc.	...	...	„ 30
			<hr/>
			Rs. 350

To the above estimate will have to be added the working capital for the purchase of glaze and other materials.

An idea of the approximate cost of production of various sizes of jars, tea-pots, images, etc. can be had from the following tables :

Perhaps the first step to improve the pottery industry in Bengal, as a cottage industry, is to use glaze on articles made of country clay, maturing at a temperature not above 1000° C. Various kinds of articles can be manufactured to suit public taste and requirements with an approximate capital of Rs. 500 to Rs. 5,000.

Another allied industry which can be taken up in Bengal with advantage is the manufacture of roofing tiles of "Marveilles" pattern. This industry is extending in Southern India. The alluvial soil of Bengal is highly suitable for the manufacture of these tiles. Every district town in Bengal can have a tilery producing from 50,000 to 250,000 tiles per year with a capital expenditure ranging from Rs. 5,000 to Rs. 25,000. This will to a great extent eliminate the use of galvanised corrugated iron sheets which are largely used now-a-days, specially in East Bengal. The use of these tiles will certainly make the village homes of the people look more beautiful.

The machinery required for manufacturing roofing tiles is a simple hand-driven screw press with a set of moulds. The cost of one machine would not exceed Rs. 500. A simple

Articles Size and number of pieces ...	Jar ½ lb. 1 gross.	Jar 1 lb. 1 gross.	Jar 2 lb. 1 gross.	10" to 12" plaster model life images.
Cost of raw materials ...	Rs. A. P. 0 1 6	Rs. A. P. 0 3 0	Rs. A. P. 0 3 0	Rs. A. P. 0 5 8
Making and finishing charges	5 0 0 for an expert potter for 2 days.	5 0 0	7 8 0 for an ex- pert potter for 3 days.	1 4 0 for a modeller ½ a day.
Biscuit firing charge ...	0 8 0 including all.	0 8 0	1 8 0	.....
Glaze application and its charge :	1 11 0	1 11 0	3 6 0	0 4 0 for model smoulder.
(1) Chemicals ... 0 15 0				
(2) Labour ... 0 6 0				
(3) Power ... 0 6 0				
Glost firing charge :	1 0 0 including all.	1 0 0	1 8 0	
(1) Fuel, (2) Segger, (3) Labour.				
Extra charges ...	Nil.	0 8 0	1 0 0	.....
Wastage ...	1 2 11—20 per cent.	1 2 11 20 per cent.	3 1 3 20 per cent.	.....
Cost ...	9 7 5	9 7 5	33 2 3	1 13 8
Cost of each ...	0 1 1	0 1 1	0 3 9	.....

rectangular down-drift kiln connected with a short chimney with a capacity of firing from 2,000 to 5,000 tiles per charge will cost about Rs. 1,500 to construct. Wooden pallets for keeping, and drying the tiles, working tools, etc., will cost about Rs. 500. An ordinary thatched shed will be quite suitable for the location of the plant and will not cost more than Rs. 500. The remaining amount (i.e. Rs. 2,000) can be utilised as working capital.

For large scale production the capital charges and also the working expenses will have to be proportionately increased.

It is evident that the cost of raw materials used in the pottery industry is very insignificant in comparison with other industries such as textile, tanning, sugar, etc. It is only the manufacturing expense that counts. Hence, if this industry is carried on with care and efficiency a good return on the investment will be forthcoming.

Ivory Carving

In Bengal Murshidabad, famous for its silk industry, had been famous also for its ivory work. The ivory industry falls under three heads,

- (1) Ivory carving proper,
- (2) Inlaying,
- (3) Turning.

The third, i.e., turning, which includes the manufacture of bracelets and cells of varying shape and pattern used for holding the vermilion which is used by every married Hindu woman who is not a widow and the *surma* or antimony with which the Muhammadan women are wont to darken their eye-lashes, is not as important as the first and does not require much artistic skill. It was carried on in Bengal.

The second was not in vogue in the Province.

It was in the first that the art workmen of Murshidabad excelled. Birdwood mentioned Murshidabad as one of the principal centres of the industry in India and added that a colony of ivory turners had settled in the district of Rungpur in Bengal.

The skill of the carvers and the high estimation in which their work was held would be apparent from the remarks of Professor Royle in his *Lectures on the Arts and Manufactures of India* (1852) with reference to the exhibits sent to the London Exhibition of 1851 :

“A variety of specimens of carving in ivory have been sent from different parts of India and are much to be admired, whether for the minuteness of size, for the elaborateness of detail, or for the tricks of representation. Among these the ivory-carvers of Berhampore (Murshidabad) are conspicuous Their representations of the elephant and other animals are so true to nature that they may be considered the works of real artists than of mere manual dexterity”.

In 1888 again the Murshidabad carvers were declared to be perhaps the best in India, “fully displaying the finish, minuteness and ingenuity, characteristic of all true Indian art”.

But about twelve years later it had become so insignificant as an industry that Major J. H. Tuill Walsh in his sumptuous production, a *History of Murshidabad District*, dismissed the subject in a few lines. He quoted the following remarks of Nilmani Bhaskar, the only master ivory-carver “now left” :

“Nearly a hundred years ago, the man who started the first firm of ivory-carvers was Tulsi Mistry, of Enatuli Bagh (then a part of Murshidabad city), Jiagunj, under whom some twenty ‘hands’ worked daily. After his death his son, Ram Kishore Mistry, became the proprietor. During his time seven men worked under him. His son, Lal Behari Mistry, succeeded him ; and I have succeeded my father”.

Even up to 1860 there were many good ivory-carvers in and around Murshidabad. As the town became less rich and less important, the sale of their products diminished. And Major Walsh remarked, “It seems as if the industry must die out unless some effort is made to advertise it and bring to the notice it really deserves”.

Though Sylhet, which was a part of Bengal, was noted for this industry for a long time, the Murshidabad industry owed its origin to the initiative of the Mohammedan Nawab Nazims of the Province who held their court in the town. The legend of its introduction is quaint. "The Nawab", it is said, "one day called for an ear-prick, or scratcher, and when one made of grass was brought, said that it was not worthy of the dignity of a Nawab and that one must be made of ivory. An ivory-carver from Delhi was, therefore, brought to make one. While he was at work, a Hindu Bhaskar spied on him through a hole in the wall and learnt his art which he taught his son, Tulsi Khatumber. The latter soon excelled his father and was made carver in ivory to the Nawab."

The peculiar features of the work are the minuteness of the carving which required 70 to 80 different tools, and the absence of joints.

The causes of the decline of this industry are stated as follows by Mr. G. C. Dutt in his *Monograph on Ivory Carving in Bengal* (1901):—

"For lack of encouragement the Murshidabad carvers have been obliged to sacrifice quality to quantity. Established during the declining days of the Nawabs of Murshidabad, the encouragement the art received from them was but limited and sporadic. During the palmy days of Cossimbazar, when many Europeans belonging to the cotton and silk factories of the old East India Company lived there, the ivory-carvers carried on a brisk business, both in the district and out of it. Even in 1811, when the place was fast sinking into the obscurity from which it had temporarily emerged, it was still noted for silk, hosiery, *korahs* and inimitable ivory work. Similarly, when Berhampore rose into importance as the chief military station in this Province, the art flourished there for a time, but with the decline of the military importance of the town it began to wane, and had it not been for the railway communication which has made a trade with Calcutta and Bombay possible the

art would have died out long ago. Formerly the ivory-carvers used sometimes to get large orders from Government for supplying specimens of their work for the various exhibitions in England and other European countries, as also in India, but this has been discontinued in recent years, as collections for exhibitions are now generally made on loan from noblemen and zamindars, like the Nawab of Murshidabad and the Maharaja of Cossimbazar, who have the very best specimens in their possession".

This is not the place to discuss to what extent deterioration of taste is responsible for the decay of this art industry. But it is to be admitted with regret that when the ivory-carving industry in Bengal is about to be wiped out for want of encouragement, figures made of ivory in Japan and China are seen used as decorations for the rooms of opulent Indians.

The centre of the industry seems to have shifted to Delhi where many workers still earn their livelihood by this work. But a reference to the plates in the *Monograph* of the various Provinces would at once show the utter inferiority of the Punjab work. This inferiority has been referred to by the author of the *Monograph on Ivory Carving in the Punjab* :—

"There is in every figure a certain unnatural stiffness, a want of flexibility in appearance. Even in the highly carved elephant figure, where the trappings, chains, decorated howdahs, etc., are exquisitely executed, the general effect is somewhat marred by the clumsiness of the central figure. It is often a little exasperating after admiring the perfect symmetry of the tracery designs to be confronted with an animal round which these designs are worked apparently taken out of a child's Noah's Ark, without joints, and with its left side invariably concave and its right convex."

But the figures carved by the Bengal carvers are true to life. There is a practical proscription of anything which may tend to be construed into an image in the Moslem faith, and the Bengal carvers are Hindus.

To revive the industry in Bengal the workers should be organised on the co-operative principle so that they can get the raw material, i.e., ivory at a cheap price and arrange to exhibit their goods in Calcutta, and other important centres of India and abroad on commission basis.

There are two more things which have to be stressed in this connection. In Italy preliminary work for marble figures, etc., is now done by machinery and the finishing done by hand-work. This may be possible for ivory carving also. Attempts should be made to see if such machinery can be devised. If the attempt succeeds it will considerably bring down the cost of production.

Workers are still available. And it would be a pity if their skill is not utilised and the art allowed to die out in the Province where it had once flourished.

There is yet another innovation which may be introduced. Paintings on ivory are sold in Delhi. Miniatures are much in demand. In Bengal the artists may take to this branch of the industry which seems to have bright prospects.

Mention should also be made, in this connection, of in-laid work. This has seldom been tried in Bengal. In the Punjab, in Mysore and some other places this work is executed artistically and attracts the attention of discriminating purchasers. This makes the utilisation of the bits, which are of no use now, possible. There is no reason why this work should not be introduced in Bengal where both the rosewood and the ebony are available.

Jewellery

Sir George Birdwood, writing in the *Life of India*, said,

“Art being equal Indian jewellery is always more interesting than Greek, because it still expresses in direct terms the religious symbolism which has always remained the originating impulse and predominating motive of Indian jewellery and other decorative arts. It was only when these symbols passed into

Greece that they, for the most part, lost their religious significance and were manipulated as mere ornamental 'motives' ". . .

Even after 150 years of the secularisation under the influence of British rule of the antique religious life of India, only in a secondary sense, everywhere the Hindu jewellery of India still maintains its hieratic forms and their traditional interpretation in full force. In India all the necklaces, zones, armlets, bracelets, and rings worn by the Hindu women are symbolical and most of them are also, like the Englishman's wedding ring, ritualistic. This is so even among the Mohammedans whose common names for necklaces and other similar articles of jewellery are "tawij" a "fortress", a "refuge"; "tilsam" a "talisman", etc.

In Indian jewellery the chain of tradition has never been broken and the stream of evolution is more perfect than anywhere else. Gold and silver have been conspicuous features of personal ornamentation in India from the earliest times, and the taste for jewellery, contrasting in so singular a manner with the general simplicity of Indian life, impressed the ancient traveller Magasthenes towards the end of the fourth century B. C. as forcibly as it impresses the modern visitor to India. This taste has found copious expression in the literature and art of the country, and, though there has been a marked development in the production of ornaments since, for example, the sculptor recorded contemporary fashions in bas-reliefs of Sanchi (150 B. C.) and Amarawati (second century A.D.) in many instances the very forms shown in the ancient sculptures of India have been faithfully handed down the ages and can still be seen round the arms, waists and ankles of the woman of Bengal. Indeed, the ordinary peasant woman of the present day, by her bodily apparel, is a living and moving example of the extraordinary conservatism and continuity of Indian life. It is only in the great centres where foreign culture has had time to make its influence felt that jewellery like other things has entered a stage of transition from the stereotyped models of antiquity.

A reference to the Bengalee poems of the sixteenth century of the Christian era goes to show that the goldsmiths in Bengal made the *tarbala* (bracelet), gold ornaments for the ear, *kankan* (another kind of bracelet), gold necklaces, the sounding anklet, the *pensali* (rings for the fingers). These are the ornaments still in use, only their designs have undergone changes, sometimes the old designs returning at intervals.

The tools employed by the Bengalee goldsmiths have not undergone much change. The Indian craftsman's hand and foot have been subdued to the use of his traditional instruments, and he is naturally averse to adopt the unfamiliar tools of the West. His tenacity in this respect is perfectly intelligible and wise. Those who have seen the filigree workers at Cuttack must have been profoundly impressed by the incongruity between their crude tools and the delicacy of their work. It is evident that technical skill and artistic perfection can exist in India under circumstances which in the West would be considered fatal to the goldsmith's art. The tools are usually made by the craftsmen themselves and are kept in one or two lid-less tin boxes. Equally simple is the equipment of the workshop. As Mr. D. N. Mukherji said in his Monograph on *Gold and Silver Work in the Bengal Presidency*—"a small hole in the mud floor to do service as a furnace, an earthenware bowl, and a couple of fans, generally innocent of handles form the *tout ensemble* of the jeweller's workshop".

The Bengalee workman's wonderful manual skill, like his obstinate adherence to the method of his fathers, is undoubtedly in a very great measure due to the caste system and the power of heredity. The goldsmith embodies in his own person the accumulated experience of countless generations of men.

Gold and silver filigree work of great excellence is produced at Dacca and Murshidabad while the silver jewellery of Dinajpur is of highly interesting primitive forms. Dr. Taylor said,

"The Dacca workmen excel in filigree work. They make bracelets, neckchains, earrings and other orna-

ments and also vessels for *attar* and rose water, all of which are sent to different parts of the country”.

Birdwood has aptly said,

“Indian native gentlemen and ladies should make it a point of culture never to wear any clothing or ornaments but of native manufacture and strictly native design”.

The industry is destined to live and what should be done is to introduce gradually, by the demonstration of their superior utility, labour saving appliances which will reduce the cost of production. The trade in precious stones is, in Bengal, in the hands of outsiders and should be recovered by Bengalee capitalists as the sale of these stones is considerable in the Presidency and always at a profit.

The Match Industry

The year 1927 contained many notable centenaries but hardly one could be more notable than that of the invention of the friction match which occurred either at the end of 1826 or in the beginning of 1827. The ingenious inventor was John Walker, chemist and druggist, Stockton-on-Tees. Walker's “friction lights” (as he always called them) contained no phosphorus and were difficult to ignite. But the idea of adding phosphorous to the inflaming composition hitherto used was conceived by Charles Sauria, a young Frenchman, who may be regarded as the inventor of the phosphoric friction match.

India depended for a long time on foreign countries for the supply of this indispensable article of daily or rather hourly use and the first match factory in Bengal which was started was not a success. Since the starting of the first factory in India numerous difficulties which beset the path of the industry have been overcome and to-day we can safely hope to produce every stick of match we require.

The demand for match in India is enormous and other countries had captured the market so successfully that it has become necessary to use the effective weapon of tariff and pro-

tect and develop the industry in the country. The following figures will give us some idea of the import of matches into India from foreign countries:—

			Quantity (figures in 1000 gross)
Pre-war average of two years—			
1912-13 and 1913-14	...	14,560	
War average	...	14,645	
			Value (in thousand of rupees)
Pre-war average	...	8,821	
War average	...	15,331	
Post-war average	...	17,668	

But the operation of the tariff has brought about a welcome change, and the Indian industry has since been enjoying a new lease of life. A new danger, however, has appeared. A huge foreign Trust has opened factories in this country. It aims at controlling the Match Industry of the world with practically unlimited resources and accumulated experience. It actually threatens to wipe out other concerns. In Bengal two other big factories are working with Japanese capital and under Japanese management. These three practically dominate the market as foreign competition has been crippled by the operation of the tariff. The effect of the tariff will be evident from the fact that in 1931-32 only 105,000 and in 1932-33 only 57,000 gross of matches were imported into India, their value being Rs. 1,05,000 and Rs. 52,000 respectively. But if the profit goes out of the country it is practically immaterial whether the matches are imported into India or are manufactured here by foreign companies with the help of Indian labour. What should be aimed at is to supply the necessary quantity of matches by production in India so as to retain not only the earnings of labour but also the profits in the country.

At present the purpose can be best served by organising the

industry on the lines of the cottage industry. Careful enquiry has elicited the fact that the cost of production in the home industry system of manufacture of matches is not appreciably higher than the cost of production in large factories fitted up with up-to-date power-driven machinery. It stands to reason that if cottage workers can get the supply of the raw materials, i.e., chemicals, splints, veneers, paper, etc., at cheaper or wholesale rates they will be able to reduce the cost of production so as to compete successfully with big factories. Here it would not be out of place to mention that the industry, if conducted on the lines of the cottage industry, can provide whole-time or part-time employment for a large number of our people, and even old men, women and children, who are not physically fit to work in any other class of factory, can be engaged in it. Men and women coming from the middle classes, whose social traditions stand in the way of their engaging themselves in manual labour in factories, can carry on the work in the seclusion of their homes.

The home industry system of the manufacture of matches is by no means an innovation which has not stood the test of experience. As a matter of fact it is followed successfully in Japan, the country which had practically captured the Indian market prior to the imposition of the duty.

The cost of splints and veneers forms nearly half of the cost of production of matches, and factories fitted up with up-to-date power-driven machinery may easily be erected in centres where suitable wood is available for the supply of splinters and veneers to the small workers. Chemicals, papers, etc., are responsible for a good proportion of the other half of the cost of production ; and arrangements have to be made for their supply at a uniform low rate.

If Central Stores are opened for the supply of these raw materials after purchasing them wholesale and distributing them to the factories, retaining a small profit on goods supplied, the difficulty which the cottage workers now encounter would be obviated. The Central Store can be run on the co-operative principle. The most convenient arrangement would, probably,

be to effect the supply through the chain stores which we propose for the cottage industries generally, i.e., to have a Central Store in Calcutta and affiliated to it the District Stores, one in each district, to supply the Subdivision Stores, which would be connected with the local Stores—the last link in the chain. This arrangement will make it possible for the cottage workers to get their raw materials almost at the same price as the big factories.

The type of a suitable factory would be one which would purchase all raw materials almost ready made. Such factories would not manufacture the splints and veneers which are made at a cheaper cost when produced in big mills and factories erected for the purpose and the rest of the materials from the Stores. They would use only hand machine for frame filling and other processes, *viz.*, parafining, dipping into chemicals, box filling, box pasting, etc., while the pasting of labels, dozen packing, etc., would be done not only by workmen working in the factory but also by others in their homes.

The labour charges for these processes in the manufacture of matches in the home industry system would amount to nearly 6 annas per gross, i.e., one-third of the total cost of production. If it costs a little less to do the work in big factories with up-to-date power-driven machinery, these big factories would have to add to it the interest on the huge capital they employ, blocked in buildings and machinery, depreciation charges, charge for expert supervision, cost of repairs, allowance for depreciation, insurance charges, etc. These are by no means insignificant and when added together would bring up the total cost of production to the level of that in the cottage industry. Indeed, it is generally believed that the cottage workers can produce matches at a lower price than the big factories. The President of the Match Manufacturers' Association stated in his note—*Match Industry in Danger* that,

“the cottage industries using local wood and local labour can produce matches at a lower price than the factories, Indian or foreign”.

If the cottage workers or small factories use ready made new splints and standard quality chemicals, matches they would

produce would not be in any way inferior to matches produced in the big factories.

The erection of machinery for the manufacture of splints and veneers in localities where suitable wood is available is one of the conditions of success in the small industry. This can be easily done as the demand for splints and veneers is steady and must be on the increase with the development of the industry. The question of the supply of wood for splinters had long been one of those vexed questions which trouble the trade and perplex the prospective investors. Several witnesses appearing before the Industrial Commission showed that timber suitable for match manufacture can be had in India and the Commission, after careful consideration, expressed the following opinion:—

“There are certain special industries such as the manufacture of pencils, matches, tea boxes, both ordinary and three-ply, and packing cases, which require a continuous supply of suitable timber within a reasonable distance from the factories, this distance depending on the method of transport. As the species suitable for these industries do not as a rule occur gregariously, their concentration in plantations is strongly to be recommended. We understand that the Forest Silviculturists and local officers are engaged in studying the habits of these species, and that the formation of such plantations has been recommended in Bengal and Assam. Similar measures have been very effective in the case of fuel plantations of casuarina on the east coast and elsewhere in Madras, where the example has been largely followed by private enterprise”.

Private enterprise has been directed in this direction in other countries and commercial companies for pine forest plantations in New Zealand are selling shares in this country also. We are sure when the example is set by Government private enterprise will not be lagging behind in starting plantations. In the mean time both the Forest Department of the Government, which is a commercial department, and the Kashmere Durbar, which owns a large match factory, can undertake to

supply the splints and veneers necessary from mills and factories.

Of Stores we have already given the scheme.

The industry can be started on the lines of the cottage industry by investing a capital of Rs. 1,000. As we have said, for the present more factories on a big scale need not be started and attention should be concentrated on the establishment of splint and veneer making factories in forest areas for manufacture of splints and veneers for distribution amongst the cottage industrialists.

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CHAPTER XIII

SMALL INDUSTRIES

Jute Weaving

The importance assumed by the jute industry in Bengal is well-known. The centre of gravity of the industry has shifted from the village to Calcutta, from the cottage to the mill. Handicraft has grown into manufacture and trade has developed into commerce. It has been a process of development and progress. The jute mills are huge undertakings, requiring large capital and complicated organisation on Western lines.

As jute is a fibre which is Bengal's monopoly it is in the fitness of things that Bengal should have mills to convert the raw material into finished products instead of sending the fibre for manufacture elsewhere.

But though we have big mills on the banks of the Hooghly we can have small factories in the jute districts which will not enter into competition with the mills. These modest undertakings will be run on the small industries line. They will be useful as seasonal factories, where the jute growers may find seasonal employment.

These small units can be operated by suitable motive power.

An individual or a group of individuals can raise the requisite capital to purchase and set up a complete spinning plant which can be erected for the purpose. The recurring running cost will not be high because of the facilities for a regular supply of raw jute which will be supplied by local organisations referred to in previous chapters.

We need hardly say that every district, indeed, every important village, requires a number of containers for storing and sending to the market in the district or to the big centres the agricultural produce from paddy to potato. At present these bags or containers are brought from Calcutta and railway

or steamer freight has to be incurred for them. The yarn supplied by the spinning plants referred to above can be woven into such containers or bags and brought to the local organisations for disposal. The close connection between the spinner and the weaver will provide links in a chain of the industry. There will be hardly any competition with the big mills which are large producers on a commercial scale. The erection of these small factories in the jute producing areas will save the freight which will reduce the price of the bags appreciably. They will also provide useful and profitable occupation for local people. Mr. Thorburn who had studied the economic condition of the peasants of India carefully aptly said,

“To give the real India that variety of livelihood, without which, in spite of roads, railways and irrigation canals, scores of millions must suffer at short intervals from the effects of scarcity and famine, she must have flourishing home industries.”

But scarcity tends to become a permanent feature of a poor country which has not got a variety of flourishing industries. Mills are a necessity, but it has to be admitted that they suck up most of the moisture which should go to sustain the vast population of the Province and the country. Further, the establishment of such small spinning plants will go a long way in preserving the socio-economic condition of the children of the soil.

There is yet another point which must not be overlooked in connection with the jute mill industry. We are not opposed to the use of foreign capital in the present stage of our industrial development. “It is more advantageous to India,” said the External Capital Committee (1925), “that its requirements for new capital should be supplied from internal rather than from external sources, so far as internal capital is forthcoming.” But subject to some limitations “the inflow of external capital is not only unobjectionable in itself, but is a valuable factor in assisting the economic development of India.” The inflow of this capital was the chief factor in erecting the jute mills on the banks of the Hooghly. “India”,

remarked the Indian Fiscal Commission, "suffers notoriously from a lack of capital" and added, "It is on the whole the foreign capitalist who imports into the country the technical knowledge and the organisation which are needed to give an impetus to industrial development." Yet when all is said the fact remains that foreign capital takes away the profits as its share and the more it is replaced by Indian capital the better for the children of the soil.

The small jute weaving factories mentioned will help to keep a part of the profits of the industry in the Province which would otherwise go out of the country. The majority, the vast majority of the jute mills in Bengal are run by Europeans; indeed only one of them actually represents Bengalee interest, we refer to the Premchand Jute Mills erected in 1931. That is all the more reason why, if we cannot have more jute mills of our own, we should, at least, have small factories in the mofussil, not to compete with but to supplement the big mills. The big mills are supplying and will continue to supply the demand of foreign countries and of the other provinces of India where jute is not grown. The small factories will supply gunny and bags for local use and provide a number of local workers with useful occupation during the period of their enforced idleness.

A modest scheme for the establishment of a small Jute Spinning Factory with improved machines in the mofussil, is given below: This spinning plant can feed 30—35 power looms or 90—100 hand looms.

Cost of Machinery

Rs.

One Oil Engine 80/90 B.H.P. Lister Diesel	
Cold Starting Crude Oil Engine complete	
with two flywheels, fuel tank and piping,	
exhaust box, water tank, foundation bolts,	
complete set of spanners, and water con-	
nection arrangements	... 10,000

Preparing, Spinning and Winding Machinery

			Rs.
	B. F. ...		10,000
One Jute softener 32 pair rollers D/W Loaded			5,668
One Teaser Card 4' x 4'	...	...	5,629
One Breaker Card 4' x 6'	...	...	5,603
One Finisher Card 4' x 6'	...	...	6,019
One First Drawing Frame 2 headed	...		2,847
One Second Drawing Frame 2 headed	...		2,847
One 10" x 5" Roving 64 spindles	...	...	9,256
Two spinning Frames 4" x 4" 224 spindles each			18,184
One cop winder 4½" Pitch 80 spindle	...	...	3,484
One Roll winder 48 spindle	...	...	1,885
One Waste Cleaner	...	...	2,093
Total			73,515

Main Workshop Building.

			Rs.
Excluding Engine House 200' x 70'	...		4,500
Engine House 30' x 30'	...	...	1,000
Jute godown	...	...	8,000
Compound Wall	...	...	4,000
Cost of machinery erection	...	...	4,000
Machine shop tools	...	...	1,500
Store to start	...	...	5,000
Land	...	...	5,000
One 10 H.P. Generator for lighting arrange- ments	...	...	2,000
Other contingent charges	...	...	500
Total			35,500

Power required for Drive of Machinery

			B. H. P.
One Jute Softener 32 pair rollers	...	...	8
One Teaser Card 4' x 4'	...	...	4
One Breaker Card 4' x 6'	...	...	5
One Finisher Card 4' x 6'	...	...	5
One First Drawing Frame	...	...	2
One Second Drawing Frame	...	...	2
One 10" x 5" Roving 64 spindle	...	...	6½
Two Spinning Frames 4" x 4" 22 spindles each	...	...	28
One Cop Winder 4½" Pitch 80 spindles	...	...	5
One Roll Winder 48 spindles	...	...	2½
One Waste Cleaner	...	...	1
One Generator for lighting arrangements	...	...	10
Total	...	...	79

The Hosiery Industry

The hosiery industry has come to stay. We give below the import figures to show the possible development of the industry :

	1928-29	1929-30	1930-31	1931-32	1932-33
Cotton	... 85,86,581	83,92,511	53,91,767	20,81,102	27,89,211
Wool	... 5,93,283	6,69,705	2,51,252	1,55,729	2,39,790

An enquiry made by us some time ago went to show that the daily outturn of twenty-two hosiery factories of which details could be had was 668 dozen, on an average or 200,400 dozen per annum (300 working days) and their value, at the rate of Rs. 10 per dozen on an average was Rs. 20,04,000. As there were several other factories about which details could not be secured the value of the annual product could not be correctly assessed.

Bengal is the principal seat of the indigenous hosiery industry and even in this Province it is of recent growth.

The difficulties that have to be overcome by the industry will be dealt with in the section of big industries.

But one of the principal difficulties is that of lack of capital. The nature of the market is still seasonal and the large demand for hosiery goods in Bengal comes twice a year, once a month prior to the Pujas (*i.e.* in September) and again during winter. The factories, therefore, have to stock goods for sale during these two seasons. This requires command over capital or banking facilities. At present banking facilities for our industries are practically non-existent ; and factories have, therefore, to fall back upon their own resources. Big factories mean big capital which, under the existing conditions, is difficult to secure. It is not idle to hope that in the near future the mofussil banking companies will come forward to offer banking facilities to industrial concerns as the plain and pleasant path of advancing money on landed properties to impecunious landholders has now proved perilous. But we cannot afford to wait, and want a plan which will change the economic condition of the Province within five years, substituting prosperity for poverty ; and for the present we must confine ourselves to the existing state of things.

Under existing conditions it is easier to establish small hosiery factories than to have big factories. These factories, moreover, will provide the training ground not only for skilled labour but also for intelligent traders.

Small hosiery factories can be established by a few individuals who have money to invest, forming a company or a syndicate, preferably with limited liability, and start factories on a decent scale with scope for expansion.

The seasonal nature of the demand for hosiery goods is sure to continue for years to come, and this fact should be given proper attention to in fixing upon the capital which will have to be invested so that it may not be necessary, afterwards, to borrow money at high rates of interest.

Arrangement should be made with dealers in Calcutta for the supply of yarn, as also for the sale of the finished goods. Attempts should be made to standardise the goods so that their mark may be a guarantee for quality.

These small factories would supply local needs and send the surplus to Calcutta or other centres of trade.

Some of the successful hosiery factories in Bengal are run on small factory basis and suffer less from deficiency of capital than big enterprises, which not only require a big initial outlay but also considerable capital for running expenses.

The imposition of duty on imported hosiery goods has afforded an opportunity for the development of the industry in Bengal which it would be a folly to neglect. As we have said before Bengal is the principal seat of the hosiery industry and Bengal should be the first in the field to capture the Indian market, now that the opportunity has come.

The demand for hosiery goods is ever on the increase and is sure to increase further with the passing away of the present economic depression. Its importance has made the Government of India grant it protection. It is now for the people to utilise the opportunity.

Bengal wants various kinds of hosiery goods ; cheapness being the only cause of the demand for Japanese goods, arrangements must be made to produce cheaper as well as superior varieties, in which most of the factories in Bengal specialise. Bengal should be able to supply the wants of her people at once.

Two schemes for two types of small scale hosiery factory are given below :

(A) *Fancy Outerwear Manufacture (Woollen)*

Rs.

One Circular True Jacquard Knitting Machine

18" diam. 4 feeds, 10 needles ... 8,300

Sewing Machines for finishing garments : power-

driven industrial machines ... 2,200

The capital for the business required is Rs. 20,500 (i.e. Rs. 10,500 for machinery and Rs. 10,000 as working capital).

Receipt side (per month)		Expenditure side (per month)	
Three dozen of pull- over per day per 8 looms, i.e. 75 doz. per month of 25 working days @ Rs. 60 per doz. ...	Rs. 4,500	1. Labour @ Rs. 2 per day per head ... 2. Yarn (190 lbs.) @ Rs. 4 per lb. ... 3. Interest @ 6% on Rs. 20,000 ... 4. Depreciation at 10% on Rs. 10,000 ... 5. Other charges, etc. ...	Rs. 250 760 100 90 500
Total ...	4,500	Total ...	1,700
Net profit per month Rs. 2,800.			

(B) *Fancy Socks and Sport Hose*

Circular automatic seamless socks machines Rs.
consisting of :

Two Machines, 14 er gg. $3\frac{1}{2}$ " diameter

One Machine 10 er $3\frac{3}{4}$ " diameter

Two Winding Machines 12 and 12 spindles

Three Linking Machines for linking toes, one
for hoses

Electric or Steam shapes for ironing

One Hand Screw Press (or hydraulic if necessary)
with arrangement to heat the plates by
steam or electricity

Price inclusive of freight, insurance ... 15,000

Production per day of 8 hours

approximate ... 15 dozens

Total men employed approximate ... 10 men

Capital required for yarn, etc. for 1 year ... 7,000

Receipt side (per day)		Expenditure side (per day)	
15 dozens @ Rs. 8 per dozen ...	Rs. 120	1. Labour @ Re. 1 per day for 10 men ... 2. Raw material, i.e. $1\frac{1}{2}$ lb. per dozen @ Rs. 3 per lb. for 23 lbs. ... 3. Interest @ 6% on Rs. 22,000 ... 4. Depreciation @ 10% on Rs. 15,000 ... 5. Other charges, e.g. rent, etc. ...	R. A. 10 0 69 0 4 8 4 8 15 0
Total	120	Total	103 0

	Rs.
Net profit per day ...	17
Net profit per month (25 days) ...	425

Cotton Textile Industry

It has been found that even at the present moment when economic depression has adversely affected the purchasing power of the people, Bengal imports from Bombay, Ahmedabad and other Indian centres outside the Province cotton piece-goods worth Rs. 10,00,00,000. This is, therefore, the value of the deficit in cotton textiles which we import from other parts of India, leaving aside our imports from Lancashire and Japan. We shall, thus, require not less than 50,000 additional looms to produce the piece-goods we at present get from other centres in India. Even at the rate at which cotton mills are being established in Bengal it will take us about fifty years to erect mills to produce additional piece-goods worth Rs. 10,00,00,000. In the meantime the annual drain from Bengal will continue and impoverish the people.

This condition of things must be changed. Two means have been suggested :

(1) A number of spinning mills capable of producing necessary yarn to feed say 500 power looms should be established in the various districts of Bengal with a view to supply regularly 'wraps', *i.e.*, sized beams. In the vicinity of each mill should be established weaving sheds, each with 10 to 20 looms, which can be easily managed by *Bhadralok* youths. These small weaving factories will take their supply of sized beams from the spinning mill, and after the cloth has been woven send it back to the mill for calendering and marketing. The spinning mills will have, in addition to calendering machinery, godowns for stocking the finished goods which they will arrange to sell.

It will, thus, be possible to have a large number of looms working without any difficulty within a short time. The capital required for big cotton mills will be split up and it

will be possible for young men individually or collectively to start weaving factories.

(2) The existing mills should be encouraged to develop a new line of business by arranging to supply sized beams to small weaving factories around the mill. These small weaving factories would, as in the first case, be established by young men who would manage them. The cloth woven in the factories with the yarn supplied would be sent back to the mills to be calendered and stamped with the mills' trade mark or with that fixed upon by the weavers. In the former case the selling agency of the mills would be utilised by the small-scales factories which will relieve them of much trouble in connection with the marketing of the goods while in the latter the young men will have to make their own marketing arrangements. In case they decide to market the products on their own account, it would be convenient for them to combine for the purpose.

That there is room for such factories in Bengal is evident. If only the supply of sized beams is assured these small factories would be of immense use not only in relieving unemployment among *Bhadralok* classes, but also in providing employment for local labour—thus creating centres of industry without the disadvantages which are concomitant to big industrial centres.

By adopting this scheme the spinning mills will have an assured demand for their product and the small factories an assured supply of the material which they will use for the production of their goods. These factories will be in a better position to study local tastes and needs than distant mills, and will find it possible to adjust their output according to local conditions. And this will create something like a community of interest between the producers and the consumers.

Boot and Shoe Lace making

We have referred to boot and shoe lace making as a cottage industry. But the cottage industry labours under various disadvantages. In the cottage industry braided laces

Duties and Insurance on the above machines	Rs.
@ 50% 	3,650
Electric motor of 1.½ H.P. for running the above machines 	300
<i>Machines for metallic parts</i>	
4 attachment presses 	143
4 matrices (extra) 	32
Cost of erection of the above machines ...	300
Railway freight charges 	400
Total ... • Rs.	11,641

It is not necessary to instal all these machines simultaneously. The manufacture of one type of laces can be started on a small scale to begin with, and that will not cost more than Rs. 5,000 in all.

• Building

Main dimensions of the building should be

Length 	36 ft.
Breadth 	24 ft.
Height 	20 ft.

Cost will be about Rs. 4,000.

Labour

For working the above factory the following hands are necessary :

1 expert @ 	Rs. 50 per month.
20 workmen each @ ... ,, 25 ,, ,,	
5 coolies each @ ... ,, 15 ,, ,,	

An ordinary expert capable of running textile power machinery would be able to work these machines. Labour can be easily trained to work these machines.

Economics of the Industry

Hypothetical balance sheet of the factory during the first year of its working is given below :

DEBIT		CREDIT	
	Rs.		Rs.
1. Cost of raw materials :			
(a) Cost of 16 lbs. of cotton yarn @ Re. 7/9/7 per lb. for producing 5520 pairs of laces daily Rs. 25/9. Monthly expenses for cotton yarn ...	767	Sale Price of one pair of lace after deductions of commission, brokerage, etc. 3.6 pies per pair. Income per day Rs. 84/4. Monthly income ...	2,588
(b) Cost of 5.51 lbs. of metal @ As. 12/2 and 1/5 per lb. daily Rs. 4/3 and 1/5, monthly expenses ...	126		
2. Wages per month ...	625		
3. Cost of motive power ...	65		
4. Rent, rates and taxes @ 2 per cent. on cost of production ...	18		
5. Repairs to plant and machinery ...	150		
6. Depreciation to building @ 2 per cent. ...			
7. Depreciation to plant @ 10 per cent. ...	97		
8. Other charges @ 25 per cent. on the cost of (inclusive of wastage of production in raw material) ...	225		
Total	Rs. 2,079	Total	Rs. 2,588

Net profit per month Rs. 509.

The Hurricane Lantern Industry

One of the articles in almost universal use in Bengal and India is the hurricane lantern. No house in the mofussil can do without it. Introduced in India about half a century back

its use has now become almost universal, its convenience and utility being the chief causes of its popularity. Customs returns show that large quantities of this lantern are imported into Bengal through the Calcutta and Chittagong Ports, the annual value of the imports being approximately 10 lakhs of rupees.

This shows the immense possibilities that exist in Bengal to establish this industry. Previously the glass globes, like the frames, used to be imported from abroad. But the development of the glass industry in the Province has made it possible for Bengal to produce the globes locally, which can now withstand the competition not only of European countries and America but also of Japan.

The frames can be easily manufactured in Bengal with requisite machinery.

Qualified men, with experience acquired in countries which at present produce these lanterns, are available in Bengal. It is understood that the Calcutta University awarded the Radhika Mohon Scholarship to a Bengalee young man for the express purpose of learning hurricane lantern making under practical and commercial conditions.

The introduction of this industry, it is needless to say, will automatically give a great impetus to the glass industry. Further, the subsidiary industry of wick making will be developed.

When all these facts are considered, there remains no room for doubt about the scope for the immediate development of the hurricane lantern making industry in Bengal.

Needless to add that the immediate establishment of factories in Bengal will also secure for her the extensive market that exists in Assam, Bihar and Orissa, the Central Province, Nepal, Bhotan and other places which import hurricane lanterns—often through Calcutta. It will not only keep about 10 lakhs of rupees spent on hurricane lantern in the Province but also open a new avenue for bringing money into Bengal from other Provinces and countries.

It is estimated that the smallest economic unit of a lantern making factory is one which will have an outturn of 5,000 per week of 48 working hours.

The following gives an idea of the capital required for machinery, building, foundation and erection charges and working expenses on the basis of three months :

Block Capital

	Rs.
Price of the metal working machines ...	15,000
Price of the dies and other necessities ...	15,000
Price of the tin coating plant ...	2,500
Price of the motor with transmission line ...	1,000
Foundation and Erection charges ...	500
Clearance charges and other initial expenses ...	5,000
Total ...	39,000

Running Capital

	Rs.
Price of the raw material (for three months) ...	18,000
Labour charges ...	6,000
Power charges ...	1,200
Depreciation ...	560
Insurance ...	250
Repairs and renewals ...	500
Contingencies ...	100
Packing and delivery ...	600
House rent ...	300
Total ...	27,510

	Rs.
The output of lanterns in three months is 60,000.	
If the selling price be Re. 1 for each lantern	
the quarterly receipt will be ...	... 60,000
Less 10 per cent. Agent's commission ...	... 6,000
Net quarterly receipt ...	... 54,000
Less quarterly running expenses ...	... 27,510
Gross quarterly profit ...	... 26,490
Less Managing Agents' 25 per cent. on gross	
profit ...	... 6,622
Total ...	... 19,868

Production cost of one Lantern

	pies
Price of the raw material ...	... 57·2
Labour charges ...	... 19·2
Depreciation ...	... 1·8
Power charges ...	... 3·9
Insurance, etc. ...	... 0·8
Repairs and renewals ...	... 1·5
Contingencies ...	... 0·3
Packing and delivery ...	... 1·9
House rent ...	... 1·0

The production cost per lantern, therefore, is 7 annas and 5 pies when the interest on the capital is not taken into account. When the interest on the capital of 70,000 rupees at the rate of 5 per cent. per year is included the production cost is increased by 3 pies per lantern. Then the production cost of lantern will be 7 annas 8 pies.

The above scheme should be regarded as purely tentative in character and if any one is desirous of starting the industry he should do well to get in touch with the Director of Industries, Bengal, who is in a position to assist him with further information about the detailed working of the industry in its various aspects.

The Sugar Industry

Though one of the oldest and most important industries of Bengal and India the sugar industry had been steadily declining. Lord Curzon as Viceroy found that one tariff problem of considerable importance awaited decision when he arrived. Bounty-fed beet-sugar had been driven from the United States by heavy countervailing duties in 1897 and the beet growers had found a fresh market in India. The sugar industry occupied an important place among the agricultural industries of the country. Dr. Royle had stated that India could produce enough cane to swamp the world's market. Before Lord Curzon had turned his attention to it, the industry was valued at £20,000,000 employing two million people ; but owing to the steady increase in the import of foreign sugar the area under sugarcane had already declined by 13 per cent. and many refineries had been closed. With the consent of the Secretary of State for India, an Act was passed on March 20, 1899 conferring on the Government of India power to impose countervailing duties on imported sugar, where necessary, up to the full extent of the State bounties. There were protests from those trained in the traditions of the Manchester School of Free Trade both in England and in India. Lord Curzon said :

“I do not think that we need pay much attention to the mutterings of the high priests at Free Trade shrines. Their oracles do not stand precisely at their original premium. This is not a question of economic orthodoxy or heterodoxy ; it is a question of re-establishing a fiscal balance which has been deflected for their own advantage and to our injury by certain of our foreign competitors.”

But the Act did not have the expected effect and it was found that a new system of indirect bounties had been devised, by which German and Austrian produce was still able artificially to force their way into the Indian market. Fresh legislation was accordingly introduced by the Government of India to

deal with the altered conditions, and it met with success. When the second Act was passed, Lord Curzon said to the sugar growers and refiners :

“We are giving you a fresh lease of life now, prove yourselves deserving of the favour. Reform your methods, modernise your machinery, improve the manufactured article.”

But the indigenous industry remained stagnant. Cane sugar poured in from Mauritius and Java. Mr. Noel Paton reported that in 1910-11 over 91 per cent. of Indian imports of sugar came from Java ; and the Java planters dominated the market by scientific cultivation and organised trading.

The *Pioneer* stated that in that year India bought over £8,000,000 worth of foreign sugar, much of which might have been grown in the country. India was in the remarkable position of being at once the largest grower and largest importer of any country in the world.

Bengal neglected to take advantage of the opportunity offered. She made no attempt to extend the cultivation of sugarcane and her attention to the date-sugar industry lacked enthusiasm. She found in jute an agricultural produce which was paying and of which she had a practical monopoly. For full thirty years the price of the fibre was steadily on the increase.

The Great War had extended the demand for jute to an extent which could not be imagined before, and *post-bellum* conditions also helped the increase in the demand. Then came the depression and it became necessary to restrict the cultivation of jute. In the meantime two things have happened :

(1) Better varieties of cane have been evolved.

(2) The Government of India have imposed a heavy duty on imported sugar with a view to rehabilitate the Indian industry and make India as independent of foreign supplies as possible.

Every province has become alive to the needs of the hour ; but Bengal is slow to move, and that in spite of the fact that the Imperial Council of Agricultural Research definitely

expressed the opinion that in Bengal sugarcane can replace jute from about 100,000 acres and that Bengal is admirably suited for cane cultivation. In fact, her area under sugarcane is fourth in the list of the provinces ; in yield per acre her position is third, being higher than Bihar, United Provinces and the Punjab—the three most important sugar manufacturing provinces of India. Further, as has been stated before, it is quite possible that if some form of planning is adopted for the Province, another large area will be released for cane cultivation.

So far as the import trade of India in sugar is concerned, the outstanding feature has been the continuous reduction of the volume of imports during the years 1930-31 and 1931-32. It is a fact that the economic depression has affected the purchasing power of the Indian riyat, and even at low prices he cannot afford to buy more sugar. But the principal reason for the reduction of the volume of the trade is the "growth of the Indian sugar industry which has been increasing its production behind a high protective tariff." Foreign sugar is being rapidly replaced by Indian sugar, and consequently imports have been declining. In 1930-31 imports of foreign sugar amounted to over 900,000 tons. In 1931-32 these amounted to only 516,000 tons ; in 1932-33 these dropped to 369,000 tons.

"The reduction in the imports," according to the *Review of the Trade of India in 1932-33*, "was chiefly due to the growth of Indian production which ousted the foreign imported sugar."

The imports of sugar of all sorts, excluding molasses, decreased from 516,000 tons in 1931-32 to 369,000 in 1932-33 showing a decline of 27 per cent.

The imports of Java sugar into the different maritime Provinces during 1932-33 were as follows :

Provinces.	1932-33 tons.	per cent. of the total import from Java.	1931-32 tons.
Bengal ...	... 86,000	29	149,000

Provinces.		1932-33 tons.	per cent. of the total import from Java.	1921-32 tons.
Bombay	...	87,000	29	67,000
Sind	...	57,000	19	55,000
Madras	...	41,000	14	69,000
Burma	...	25,000	9	27,000

The imports into Bengal, thus, amount to a huge figure. And yet Bengal is favourably situated for the cultivation of cane, while her date trees, once planted, go on yielding juice for over 15 years without attention.

Most of the other Provinces have not been slow to take advantage of the situation created by the imposition of the duty ; sugar mills have been erected and the cultivation of cane extended. Bengal not only imports sugar from foreign countries but also from the other Provinces of India, while as the Tariff Board has pointed out, there are various centres in the Province where, even at the present time, more sugarcane is grown than can be profitably utilised for the production of *gur*.

It is, however, a happy augury that a couple of big factories have been established in the Province though these are being owned and worked by non-Bengalee capitalists. But to meet the total requirements of the Province many more such factories will be necessary.

The consensus of expert opinion on the subject is that the industry should succeed either in very big units or very small units. Intermediate sizes will not prove successful in the long run, when due to competition profits come down, because of the overhead charges and also of the necessity of having departments for all stages of production and refining without being wholly occupied. Large units are certainly desirable from purely economic consideration, but there are defects and difficulties in Bengal. Apart from the fact that a large amount of capital will be necessary for such a unit, which may not be possible to be raised in the Province, these are not exactly what Bengal needs for solving her socio-

economic problems. Then, big factories require large cane growing area around the concern, and although eventually this may be possible, at present such supplies are not available. Lastly, the establishment of big factories will throw a large number of people out of their subsidiary employment of *gur* manufacture and instead of relieving unemployment, establishment of big factories will intensify the problem.

As matters stand at present Bengal should generally go for small scale mills. The average man in the Province does not want crystal sugar, nor does he require perfectly white stuff. He is satisfied with brown or semi-white sugar ; and this can be conveniently produced from *gur* without large capital outlay. The factory law will not apply in such cases, and there will be relief from the excise duty. The output of sugar in this process is no doubt less than when it is obtained direct from cane, but the absence of large capital charge and overhead expenses will reduce the disadvantages of the small units ; further, if suitable heating or drying arrangements can be made, the work of these factories can go on for at least six months in the year. The most important point is that such units will be within the reach of middle class people. Moreover, it will not dislodge the cane growers from preparing the *gur*. These small factories will generally cater for the local demand, and the question of freight will not arise in this case at all.

The different stages in this process, *viz.*, sugar from *gur* are too well-known. The machinery needed for a unit producing about 800 maunds of sugar a month are :

- (1) Source of power, either electric motor 10 H.P. if electricity is available, or oil or steam engine.
- (2) Four Centrifugal machines.
- (3) Crystallizer.
- (4) Pulley, Shafts, etc.
- (5) Pans.
- (6) Tank, Pumps.
- (7) Heating and drying chamber.

Machinery for a complete unit for producing 800 maunds of sugar a month should not cost more than Rs. 5,000.

The recurring cost should be about Rs. 450 per month including overhead charges and depreciation but excluding the price of raw material. These are under heads—labour (about 12 men including a couple of skilled hands), chemicals, rents, electric charges, coal, bags, management, etc. Raw material : about 1,600 maunds of *gur* for 800 maunds of sugar will cost in Calcutta about Rs. 5,500 ; in mofussil it will be much less. At a most conservative estimate of price of the products (sugar Rs. 8 per maund and molasses As. 12 per maund) these will fetch about Rs. 6,800, leaving a margin of about Rs. 800 per month. Sugar commands a ready market and payments are cash. There are certainly some technical difficulties in the actual process which necessitate the locking up by a couple of months working capital but improved machineries are already on the market, reducing the difficulties.

If, however, a little larger amount of capital is available, manufacture of sugar direct from cane may also be undertaken. But it is desirable that such units will only be established where sufficient quantity of cane is available and where there is no large risk of dislodging growers from their secondary occupation, *viz.*, *gur*-making. Below is given a scheme for a small sugar factory with up-to-date machineries for crushing 18 to 20 maunds of sugarcane per hour :

One Tripple roller, power-driven Crusher specially designed to crush 18 to 20 maunds of sugarcane per hour. The crusher should be tested to extract 60 to 65 per cent. juice when crushing C.O. 213 variety.

One complete set of "Rohilkhand Process" pans suitable to treat 130 maunds of juice in 12 to 14 hours, complete with tools, equipments for panman, etc., also furnace of one approved design with chimney, fire-doors, etc.

Two Crystallizers, each of one ton capacity, to be operated by hand, complete with all fittings.

One Puggmill with reduction gear and all fittings.

One Suspended Type, Self-balance Sugar Centrifugal of special design, size 18" × 12" complete with driving pulley, belting, etc. This Centrifugal will have a capacity of approximate 1½ maunds per hour.

One Horizontal, four stroke, four cycle, full Diesel, cold starting Engine of 17½ B.H.P. complete with all fittings, driving pulley, water cooling system, etc., including transmission gearings, beltings, etc.

Total price of above Plant packed and Rs.
delivered f.o.r. Calcutta. ... 7,600

Extras

One set of molasses boiling pans for 2nd sugar complete with furnace equipments, one pair of scales with necessary weights, one set of tools with almirah, ;
one set of standard spares for the crusher, centrifugal oil engine, etc. ... 1,250

Erection charges ... 500

Foundation—All raw materials including bricks, cement, etc., for foundation of the entire plant, also masonry work would cost approximately ... 700

Technical Details

Provided the variety of cane is of high sucrose contents, such as, in the case of C.O.213, the following calculations may be safely depended upon :

1. The approximate extraction of juice by a three-roller power crusher will be 65 to 70 per cent.
2. The approximate quantity of 1st "Rab" will be 20 per cent. of the juice extracted.
3. The approximate quantity of 2nd "Rab" available will be 9 per cent. of the juice extracted.
4. Approximate 6 per cent. of the total weight of cane crushed will be 1st sugar.

5. Approximate 1.5 per cent. of the total weight of the cane crushed will be 2nd sugar.

6. A total of 7.5 per cent. of sugar is available from C.O.213 variety of cane.

7. Final molassès available, approximate 6 per cent. of the total quantity of juice.

Details of Manufacturing costs

				per month
				Rs.
1	Head Panman	...	...	100
2	Asst. Panmen	...	...	40
1	Panman for 2nd sugar	...	...	40
1	Asst. Panman for 2nd sugar	...	...	15
1	Engine Driver	...	...	30
1	Oilman for crusher and engine	...	...	15
1	Cane feeder	...	...	12
1	Bagasee remover	...	...	10
1	Fireman	...	...	12
1	Juice carrier to the pans	...	...	10
2	Drivers for Crystallizers	...	...	20
1	Man for charging and discharging centrifugal	...	...	10
1	Centrifugal Driver	...	...	25
1	Man for feeding and carrying molasses to the	...	...	10
	pans	...	...	10
2	Sugar dryers	...	...	20
1	Man for weighing cane and bagging sugar	...	...	10
1	Clerk	...	...	20
1	Caretaker	...	...	12
	Total	...	...	411

Fuel Lubricating

				per month
				Rs. A.
For Engine	...	...	...	127 0
Lubricating for crusher	...	...	...	2 0

			per month
			Rs. A. •
Chemicals for clarification	...	...	15 0
150 bags	...	...	45 11
6,480 maunds of sugarcane @ As. 4 per maund			1,620 0
Total	...	...	2,220 11

Revenue			
Debit		Credit	
	Rs. A.		Rs. A.
Total running expenses including raw material	2,220 11	Total sugar 1st	
Spare parts and fittings approximately	50 0	and 2nd quality	
Overhead and contingencies bases @ 2½ per cent. on total sale value of the production	91 11	455 mds., per month @	
		Rs. 8 per md.	3,640 0
Depreciation @ 20 per cent. per annum on the estimated sum of approx. Rs. 10,000	166 10	Final molasses 234 mds. per month @ As. 2 per md.	29 4
Total	2,529 0	Total	3,669 4
Net profit	...	Rs. 1,140-4.	

The Leather Industry

The various departments of the leather industries will be dealt in detail in the large industry section of the book. That there are departments in which work can be profitably done on the lines of small industries is evident ; and these are

- (1) Taxidermy
- (2) The Shoe Industry
- (3) The Leather Goods Industry

Young men specialising in taxidermy would do well to start work in Calcutta. At present many *shikar* trophies and specimens are sent abroad to be cured and mounted. Judging from the keen interest taken in this country in *shikar* by Indians as well as Europeans it can be said that there is wide scope in this industry for trained men.

The shoe industry ought to attract our young men. At present the industry is pursued in Calcutta chiefly by Chinese workers and shopkeepers, who employ Bihari *muchis* for stitching. About 800 Chinamen and 6,000 Bihari *muchis* produce the bulk of the product. The shoes are practically hand-made and turned out in small establishments, all of which are situated in the back streets of Calcutta. The products are comparatively cheap and fairly attractive. They command ready sale. The Bengalees derive no benefit from this fairly important industry in Bengal—neither in the production, nor in the distribution. They only buy the shoes that the Chinese and the Biharis make.

The first step that should be taken to develop this industry for the benefit of the people of Bengal is to divert it from Chinese to Bengalee hands. For this, it is necessary to attract capable Bengalees to the shoe trade. To some extent it is being done by the Bengal Tanning Institute where facilities have been provided for training up Bengalee *bhadralok* youths in the shoe making craft. Trained students are encouraged to start shoe making. Under the Unemployment Relief Scheme, also, peripatetic demonstration parties are imparting training in shoe making. It is hoped that in course of a few years a number of trained Bengalees will be put into the shoe industry and will participate in its profit. As yet the training is given in hand sewn shoes only as are now made by the Chinese with the help of the Bihari *Muchis*. The dimension this industry has assumed will be evident from the number of people employed—about 800 Chinese and about 6,000 Biharis. The number of workers in leather in Bengal, according to the latest census, is 8,436. and the number of Bihari *Muchis* working

in Calcutta alone in the small factories of Chinese proprietors is 6,000. The figures tell their own tale and are significant. The number of *Muchi* males in Bengal has been given as 220,103. How are the majority of those not workers in leather employed? It is common knowledge that unemployment is keen among them, and poverty hinders their material progress, not to speak of the raising of their standard of living. The Bihari *Muchis* who work in the factories in Calcutta can be replaced by Bengalees which will provide employment for at least 6,000 Bengalees in the shoe industry in Calcutta. It is strange that this possibility has not yet attracted the attention of those who are working for the amelioration of the condition of the so-called depressed classes whose economic condition stands in the way of their improving their position. The hereditary training of the *Muchis* should be improved and fully utilised. How a little effort can do this has been demonstrated at Bankura where some Christian Missionaries have been eminently successful in training up local *Muchis* to manufacture shoes which defy the competition of Chinese made shoes. The combined efforts of *bhadralok* youths and Bengalee *Muchis* would be able to secure for Bengal the profit accruing from this industry.

The leather goods industry also should be developed by our young men with the help of local workers in leather. At present the commoner varieties of leather trunks, suit cases, attache cases, bags, etc., are locally made but goods of superior quality are imported. A good deal of improvement in the make and finish of the local products is necessary to bring them in line with imported articles. The manufacture of high class articles should be undertaken in Bengal. To foster the development of this industry, the Bengal Tanning Institute has been giving a regular course of instruction in the manufacture of leather goods. The field has, however, not been sufficiently covered. There is plenty of room for increase in the quantity and improvement of the quality of goods. The industry does not require costly machinery or implements and

the intelligent application of training received by our young men would result in the development of the industry and make it profitable.

The Celluloid Industry

Within a comparatively short time celluloid has acquired an importance in the industrial world which is surprising. It is the chemist's creation and is a hard elastic compound made by subjecting guncotton (pyroxilies) mixed with camphor and other substances to hydraulic pressure. It is an imitative substitute for such valuable things as ivory, tortoise-shell, coral, malachite, etc., and its use is daily expanding. Combs, buttons, spectacles and various other articles for which ivory, horn, tortoise-shell, coral, metal, and other expensive materials were used are now made of celluloid which takes a high polish and can be produced in any colour, or blending of colours. Its use is extending to various departments and there is to-day hardly an industry in which it cannot be used in some form or other. It has been used in the manufacture of artificial teeth, mirrors, cigar cases, tooth brushes, hair brushes, knife handles, book covers, pens, pencils, umbrella handles, soap dishes and soap cases, shoe horns, hair-pins, paper cutters, etc. The raw materials for the manufacture of celluloid except camphor, which has to be imported from Japan, are available in India ; and though experiments at growing the camphor tree have not proved promising, yet there is reason to believe that it may not be impossible to grow it in India. But for the present India must depend on imported camphor. It has been found that it costs less to manufacture celluloid in India with some materials which have to be imported than to import celluloid. Moreover, factories for the manufacture of celluloid would afford employment to the unemployed and ensure the supply of the commodity to factories in the country started to produce the thousand and one articles, in the manufacture of which celluloid is now used. The number of comb and button factories are on the increase in Bengal. The Department of

Industries has been teaching people umbrella making under the Unemployment Relief Scheme, and umbrella factories are being started in various parts of the Province. Fancy handles for umbrellas are now imported from abroad and their manufacture can easily be undertaken by celluloid factories in Bengal. With the development of the cutlery industry the demand for handles will increase. Soap boxes, powder boxes, hair-pins, dolls, toys made of celluloid, have a ready market in Bengal. This will be evident from the stock in the Canning Street shops at Calcutta which are all well stocked with cheap celluloid articles.

Attempts to establish celluloid factories in Bengal have proved successful, while several factories are producing fine articles with imported celluloid. Some youngmen are turning out spectacles frames, combs and buttons, running the industry as a cottage industry, in which the work is done by members of the family with the help of hired labour when necessary. An important feature of the industry is the employment it can give to women. The comb and button factories at Jessore give their articles to women, who finish them in their homes and earn something by utilising their leisure hours. This special feature of the industry should not be lost sight of, as the necessity of finding profitable occupation for women without concentrating them in factories should be replaced at a time when every member of the family must work because of the growing severity of the struggle for existence. The celluloid factories can be conveniently established in our mofussil towns, which must take their part in the industrial development of the Province. Necessary capital can be collected locally and investors would naturally feel more confidence in men whom they know intimately and in whose integrity they have faith. Practically every mofussil town has one or more banks. Up to now they had only invested in land. The sad experience of the present economic depression has convinced them of the folly of investing in this kind of security alone, and thus usurping the function of the land mortgage banks which alone can safely give long-term loans. In future

they should invest considerable portion of their working capital collected locally in developing local industries, taking proper care to examine the actual possibilities of the undertakings and exercising, where necessary, proper control over their management without undue interference. The Department of Industries can give them valuable assistance and proper financial check would go a long way to preclude the possibility of loss through leakage, etc.

The scheme for a celluloid factory can be obtained by reference to the Department of Industries. •

Button Making

Button making as a cottage industry has been dealt with before. But it is likely that there will be people willing to start it not as a cottage industry but as a small industry with machinery, so as to bring a decent return capable of supporting not only some labourers but also of keeping some intelligent and educated men engaged.

Large quantities of horns are found lying on the fields ; when collected, they fetch a small price. But they can be profitably utilised for making buttons. Buffalo horns are the best horns to make use of in button factories. The supply of these horns in some of the towns of Bengal and specially in Calcutta, where they can be secured from the Corporation contractors, is almost unlimited. And if big factories with modern machinery are set up, and buttons are produced on a mass scale, it is likely that the cost of production may be reduced sufficiently to compete successfully with cheap imported buttons.

Manufacture : Horns are composed of two parts, hollow and hard. Approximately about two-thirds of a horn is hollow and one-third hard. The first operation in the manufacture of buttons from horns is to cut off the hard part (commonly known as tip or full end) from the hollow part. The tips can be used directly to make buttons, while the hollow part should be prepared or treated before it can be used for making buttons

known to the trade as *porlitta* buttons. The process of treatment is as follows :—

The hollow part is cut open at the thinnest spot on the circular saw. The cut horns are then put in hot water and allowed to stay there for some time, or for quick manipulation they are shaved. The shavings while still hot are pressed by hydraulic hot and cold plate presses to the shape of plates. Before use these plates are sorted according to shade and allowed to stay in water for some hours. For the softness of buttons the solid tips and plates prepared from hollow horn are first put in the blank cutting machine. The blanks are either turned or pressed, embossed, dried and finally polished in the machines enumerated below.

Machinery required

The list of machinery required for a factory capable of producing about 100 gross of buttons daily is given below :—

	Rs.
2 saws	336
1 Hydraulic Press	1,808
1 Steam Boiler	1,050
4 Blank cutting machines	1,952
6 Turning machines	2,400
1 Embossing Press complete with die ...	412
3 Drilling machines for drilling the holes	4,984
4 Scouring machines for scouring the buttons before polishing ...	1,312
2 Barrel Polishing machine for polishing the buttons	656
2 Polishing spindle stocks for high class polishing	472
1 Tool grinding machine	240
Spare parts	400
Motor shafting, other accessories, etc.	1,500
Total ...	17,522

The machines absolutely essential are those marked with an asterisk. The rest may be added gradually.

Building Dimensions.—60 ft. × 25 ft. floor space. Cost will be Rs. 4,500 approx.

Economics of the Industry

Debit		Credit	
	Rs.		Rs.
1. Cost of raw material 1440 mds. @ Rs. 6 per maund	8,640	Sale price of 30,800 gross of buttons at an average price of Re. 1/6 net per gross after all deductions, commissions, etc.	41,250
2. Wages including management	9,300		
3. Cost of motive power	5,400		
4. Rent, Rates and Taxes	500		
5. Repairs to plant and machinery	1,000		
6. Depreciation to plant @ 10 per cent.	1,800		
7. Depreciation to build- ing @ 2 per cent.	100		
8. Other charges, etc.	6,000		
<hr/> Total			

Profit per month Rs. 700 (approximately).

Penholder Making

Penholders are now to be found in every house where literacy prevails. The old swan or goose quills are no longer in use and the reed pen is fast becoming a thing of the past. The penholder is almost in universal use and is usually made of wood. Bengal now possesses one or two factories which turn out holders which are as good as those imported from abroad. But the demand cannot be met by these factories, and there is room for some more. Both cheap and comparatively costly holders are in use. Suitable wood can be had in Bengal

and for the manufacture of the metallic part iron and tin sheets are now obtainable from Tata's Tin and Steel Sheet works.

For the manufacture of holders two separate operations are required, *viz.*, the making of the wooden handle and the making of the metallic part. The handles are made from rods prepared from wooden planks by turning them to the required shape and size on the machines. One end of the rod is then made ready for the metallic part to be fixed on. The metallic part is made by punching metal blanks in the cutting press and rounding into the requisite shape in a rounding machine. Then the metallic part is fixed on to the handle. The handles when made from wood are neat, coloured, varnished and polished.

Specifications of the plant for producing fifty gross of penholders per day are given below:—

	Rs.	A.	P.
1. One saw with slides for cutting the planks	490	0	0
2. One grooving and shaping machine with feed	1,026	10	8
3. One tools-grinding machine with sand paper drum	261	5	4
4. One conical forming machine with grinding	700	0	0
5. One penholder boring machine complete with automatic centering	490	0	0
6. One tanom cutter (This machine is useable on the boring machine)	48	11	6
7. One rounding head for operating the penholders	42	0	0
8. One polishing and finishing stand	242	10	8
9. One dipping apparatus complete	140	0	0
10. One dipping board	11	3	3
11. One hand stamping machine with foils, etc. complete	303	5	4
12. One cutting press for the metal tips with one tool	555	5	4
13. One rounding machine driven by hand for rounding and punching the tips including one tool	1,152	8	10
14. Accessories	335	7	4
Total ...	5,799	4	3

Building

The dimensions of the building for the penholders industry would be :

Length	...	...	...	40 ft.
Breadth	...	...	...	25 ft.

and it will cost about Rs. 4,500.

Economics of the Industry

Debit	Rs.	Credit	Rs.
Cost of raw material for 178,200 penholders		Net production of penholders per month after allowing breakage @ 5 per cent.	
(a) Deodar wood		hold e r s—1,235	
Rs. 182		gross of holders	
(b) Varnishes and Colours	Rs. 407	Selling price of one gross of holders after all deductions such as commission, brokerage etc.,	
(c) Metallic parts		Rs. 2/4/- per gross	...
Rs. 156		2,778-12	
	745		
2. Cost of labour	619		
3. Cost of motive power	175		
4. Rent, Rates & Taxes @ 2½% on cost of production	44		
5. Repairs to plant	50		
6. Depreciation to plant @ 10% per annum	78		
7. Depreciation to building @ 2% per annum	8		
8. Packing expenses	250		
9. Other charges	250		
	2,219	Total	2,778-12
Profit per month	559-12		

Nib Making

Nibs for pens form an important item of stationery. At present there are only three factories manufacturing nibs in India, one in Calcutta, one in Bombay and one in Gwalior. From information derived from these factories it is evident that they are showing good profit. In Bengal during the Swadeshi agitation days the cutlery makers of Ujirpur (Backargunj) made nibs which were crude, as they could not be finished properly, being turned out from improvised machinery and with crude tools. Attempts made by some mistries in Sialkot and Gujerat to manufacture nibs ended in failure for lack of capital. Nibs are made from various materials such as steel, copper, brass, German silver, aluminium. The metals are used in the form of sheets which, in the beginning, will have to be imported. The metal used should be pure.

The extensive use of fountain pens has opened up the possibility of making nibs for them. The nibs are usually made of gold which does not get corroded while the tips, made of a harder metal, generally irridium and sometimes platinum, are soldered on to the metal points by means of blow pipe. At present the fountain pen manufacturers have to import these nibs and the pen is thus assembled in India. This can be obviated if necessary nibs are manufactured in the country. The import of ordinary nibs also takes away a large sum of money every year. The method of manufacture is the same in the case of all types of nibs. The following extract will give an idea of the process of manufacture :

“The metal used consists rolled sheets of a steel of the finest quality made from charcoal iron. These sheets after being cut into strips of suitable width, annealed in a muffled furnace and picked in a bath of sulphuric acid to free the surface from oxidised scales, are rolled between steel rollers till they are reduced to ribbons of an even thickness about 10/16th inch. From these ribbons the pen blanks are next punched out and then, after being embossed with the name of

the maker or other marks are pierced with the central perforation and the side or shoulder slit by which flexibility is obtained. After another annealing, the banks which up to this point are flat, are 'raised' or 'rounded' between dies into the familiar semi-cylindrical shape. The next process is to harden and temper them by heating them in iron boxes in a muffle surface, plunging them in oil, and then heaping them over fire in a rotating cylindrical vessel till their surfaces attain the dull blue tint characteristic of spring steel elasticity. Subsequently they are scoured in a bath of dilute acid, and polished in a revolving cylinder. The grinding of the points with emery follows and then the central slit is cut by the aid of two very fine edge cutters. Finally, the pens are again polished, and are coloured by being heated over a fire in a revolving cylinder, and in some cases are coated with a varnish of shellac dissolved in alcohol."

Specifications of the plant for producing 65,000 nibs per day of 8 hours is given below :

Machinery required

			Rs.
	...		
1.	(a) One double sided Crank Press	...	2,198
	(b) Straightening device for the above	...	560
2.	One "Wind off" Reel	...	50
3.	One "Wind up" Reel	...	98
4.	(a) Ten Double Fillar 8 Screw Presses	...	2,240
	(b) Stop Nuts to fit the above machines	...	280
5.	(a) Ten open-back Fly Screw Presses	...	2,520
	(b) Stop Nuts to fit the above machines	...	280
Total		...	8,226

Building

The dimensions of the building for the factory would be as follows :

Length	...	40 ft.
Breadth	...	20 ft.

It will cost about Rs. 2,500, exclusive of the price of the land.

Economics of the Industry

Debit			Credit
		Rs.	Rs.
1. Cost of raw material ...	1,113		Net production per
2. Cost of labour—wages	685		month after
3. Rent, Rates and Taxes			allowing wastage
@ 2% on the cost of			and breakage @
production ...	57		5%, 11,149 gross
4. Repairs to plant ...	80		of nibs, the selling
5. Depreciation on the			price of one gross,
cost of plant @ 10%			of nibs after all
per annum ...	88		deductions, such
6. Depreciation on the cost			as commission,
of building @ 2% per			brokerage, etc. @
annum ...	4		-/5/- per gross 5,574
7. Packing charges ...	300		
8. Annealing and harden-			
ing charges for the nibs			
@ 25% on the cost of			
raw material ...	278		
9. Other accidental ex-			
penses ...	300		
Total ...		2,905	Total ... 3,484

Net profit per month Rs. 579.

Sand-Paper Making

The use of abrasive (glass and emery) paper, generally known as sand-paper in the industries of iron, steel and wood, is a necessity. And yet there is not a single factory in India which produces it. Thus we have to depend wholly on foreign countries for the supply of this important article. If the

supply is stopped our iron, steel and wood industries will be at a standstill.

A scheme for the erection of a factory capable of turning out about 18,000 sheets (12" x 9") a day of 8 hours is given below.

In an automatic apparatus the cloth or paper reel is first printed on the back with the trade marks and the number of emery or sand to be used. The reel then is made to travel through the gluing machine where glue is spread uniformly by means of stationary and jiggering brushes. Then the glue-coated reel travels through a strewing machine where the emery or glass compound are spread over the glue. It then passes through drying boxes where it is dried by suitable heating and ventilating units. From there it passes through slitting and cross cutting machines where the reel is cut immediately into standard sizes.

The machinery required and the approximate cost are as follows :

	Rs.	l.	s.
1. One Printing Machine used for printing the name and address of the firm or the trade mark on the back of the paper	714	0	
2. One Gluing Machine	2,054	8	
3. One Pneumatic Pulling Apparatus endless felt hose and exhauster ...	294	0	
4. One cooling table with blowing fan, transporting chains and rods to transport the paper or cloth ...	420	0	
5. One Spreading Machine for spreading the glass or emery on the paper ...	969	8	
6. One iron heating plate for steam heating	318	8	
7. One Second Pneumatic Pulling Apparatus with endless felt hose and exhauster	294	0	
8. One Hanging-up Apparatus with 2 turn tablestand complete self-acting rod arrangement for drawing the paper	2,317	0	

	Rs.	A.	Bt. 7,381-5
9. One Square Cutting Machine for cutting the paper into trade lengths* ...			1,997-1
10. One Glue Boiler for preparing the glue	360	0	9,379-1
11. One Press for packing of sheets ...	1,137	8	5,000/-
12. Electric Motor of 5 H.P. for above ...	500	0	6,000/-
			2,037-1

It will be necessary to set up a grinding and sifting plant when it is desired to produce emery and glass powders in the factory. This plant will cost about Rs. 5,000 extra.

A rough estimated cost of a building 50 ft. by 26 ft. by 18 ft. will be Rs. 6,000.

Economics of the Industry

Debit	Rs.	Credit	Rs.
Cost of raw material for 18,000 sheets per day of 8 hours—		Sale price of sand papers @ Rs. 2/- per gross, therefore, monthly sale proceeds amount to (approximately)	7,500
(a) price of 9 reams 450 lbs. @ -/3/- per lb. ...	84 6		
(b) price of 144 lbs. of glue @ -/4/- per lb. ...	36		
(c) price of 405 lbs. of sand @ -/1/- per lb. ...	25 5		
Total per day ...	145 11		
Total per month	4,370 10		
Other charges ...	2,027 0		

Total ... 6,397 10

Total ... 7,500

Net profit per month Rs. 1,103 (approximately). at 12% per annum

* Details from the Department of Industries.

a/c
 Depreciation 10% - 2100/-
 Cp. invested Rs. 21,000/- on Plant and Building
 21,000/-

Vegetable Oil Refining

Bengal produces large quantities of oil seeds while others may easily be imported from the neighbouring provinces. Unless the oil extracted is refined, *i.e.*, made free from the impurities such as albumen matter,* gum, etc., which are found in most vegetable oils, it is not possible to use it for technical purposes. The refined oil is used for various purposes in addition to cooking. It finds use in preparing button substitutes, in medicinal and pharmaceutical preparations, in paints and enamels, in candles and soaps, and is also used as lubricants and greases. The soap and paint industries are on the increase, resulting in the increased consumption of refined oil. The use of lubricants and greases also is rapidly increasing and large quantities of them which can be easily produced in Bengal are being imported from outside the Province. It has been found that a small factory for refining oil can be started with the modest capital of Rs. 5,000. But it is doubtful if now that the industry has become established in other countries and some of the other provinces small factories may be made paying propositions, specially because the competition will be with big industries.

The process of refining is not very complicated. The raw oil is sucked under vacuum into the neutralisation and bleaching apparatus in which it is warmed to the specified temperature, the fluid being stirred during the process. The requisite quantity of caustic soda bicarbonate is then pumped in in a finely divided state. When the neutralisation is complete, the soap formed is separated and the oil is washed out several times with warm water and treated with fullers earth and filtered through filter press. This refines and bleaches the oil. When it is desired to deodorize the oil, super-heated steam, at requisite temperature, is passed into the refined and bleached oil under vacuum till it passes the desired taste test. It is then filtered again. If the refinery is attached to or in contact with an oil and soap factory, the separated residue from the oil can be directly utilized for soap making.

As has been said before it is doubtful if a small oil refinery started with a capital of Rs. 5,000 can be made paying. For a big refinery the capital required would be Rs. 42,000.

Specifications of the plant capable of turning out 13 maunds of oil per day of 8 hours :

Machinery required

	Rs.
(1) One Iron Ghani	350
(2) One Mixing and Refining Vessel with stirring arrangement	1,500
(3) One Filter Press	600
(4) Storage tanks for oil	500
(5) Two Electric Motors of 3 & 4 H.P. each	600
(6) Accessories	500
(7) Cost of erection	500
	<hr/>
Total	4,550

Building

The dimensions of the building for the factory would be :

Length	40 ft.
Breadth	25 ft.

It will cost about Rs. 3,000 exclusive of the cost of the land.

Economics of the Industry

Debit	Rs.	Credit
1. Cost of raw material ...	3,435	Net production of oil and
2. Cost of labour—wages ...	187	oilcake per month after
3. Cost of motive power ...	205	allowing wastage of 7
4. Rent, Rates and Taxes		per cent.
@ 2% on the cost of		(i) Oil ... 335 mds.
production	86	(ii) Oilcake 608 „
		Selling price of oil and

Debit.			Credit	
		Rs.		Rs.
5. Repairs to plant	...	50	oilcake after all deductions, such as commission, brokerage, etc.,	
6. Depreciation on the cost of plant @ 10% per annum	... ..	38	will be (i) oil @ Rs. 11 per md., (ii) oilcake @ Rs. 1/14 per md.	
7. Depreciation on building @ 2%	... ..	5		
8. Other incidental expenses	... ..	400	Income per month will be	
			(i) from oil	... 3,685
			(ii) from oilcake	1,140
<hr/> Total ... 4,406			<hr/> Total ... 4,825	

Net profit per month Rs. 419.

The Glue Industry

The need for the production of glue in India was keenly felt during the Great War when foreign sources of supply were getting blocked. At the request of the Indian Munitions Board the manufacture of glue, which was in great demand for use in the construction of aeroplanes, was undertaken by the Chemist of the Leather Trades School, Madras. Experimental work was carried on in the Madras Presidency College Laboratory and success was achieved. Further experiments on a large scale were undertaken at a chrome tannery by a student of the Leather Trade School. The machinery was of primitive type with the exception of an evaporating pan but afforded opportunities for carrying on the experiment which resulted in the production of the commercial article.

In his article on the Glue and Gelatine Industry in the *Industrial Hand Book* published by the Munitions Board (1919) Mr. Fowler remarked:

“Raw material for glue and gelatine exists in large

quantities in India. The number of animals which die or are slaughtered annually are enormous. Besides bones and their associated sinews other possible sources of glue and gelatine exist in India, particularly, scrappings and cuttings from hides which are at present largely a waste product of tanneries."

One of the many commercial secrets revealed by the Great War was the fact that a very large quantity of tannery waste used to be exported to Germany presumably for the manufacture of glue. The closing of this market to fleshings caused a great accumulation of this material in every Province.

At the instance of Mr. Tressler, the then Director of Industries of Madras an attempt was made in 1916 to manufacture glue in Madras from fleshings. The experiment, though not completely successful, was such as to encourage further experiments in the direction of devising some method of making glue solution set to a jelly at the temperatures generally prevailing in Madras. Then came the request from the Munitions Board referred to above resulting in the experiment which proved successful.

The glue produced in Madras was of excellent quality suited to high class furniture work, book-binding and roller composition. "It is difficult," said a statement issued by the Madras Publicity Bureau in 1922 when the factory in Madras capable of turning out 80 tons or more of glue per month, was re-opened—"to believe that quality for quality any cheaper glue than this can be obtained, and nothing approaching this standard is produced elsewhere in India, whilst English and Italian glues are too dear to permit of any competition."

The process of manufacture is comparatively simple, only great care has to be exercised at all stages of manufacture. The fleshings which can be obtained from local tanneries are first mechanically and then chemically cleaned. They are then digested with distilled water and the resulting liquor is first clarified and afterwards concentrated. Concentration is effected with the aid of pre-heaters, etc. so as to permit of continuity and rapidity of operation. The concentrated liquor is then allowed to set in shallow plates, cut into blocks and dried.

Gelatine is a refined form of glue and is best obtained from sinews (or from bones from which the mineral matter has been separated by acids) by treatment with lime, washing, bleaching with sulphurous acid, steaming, clarifying and evaporating.

In Calcutta any amount of scrapplings and cuttings from hides can be easily obtained from the numerous tanneries that are at work, as also bones. The glue industry can be successfully carried on as a small scale industry.

The establishment of this industry will result in a waste product of tanneries being profitably utilised. It is evident that great possibilities exist for making valuable byproducts from the waste products, if they are worked up in Bengal.

Further utilisation of the materials would require the erection of big factories and does not come under the purview of this division of the plan because plant and buildings to deal with 10 tons of bones and sinews per day would probably cost about 3 to 4 lakhs of rupees. But as regards the resultant bone meal, there is likely to be an outlet in Bengal itself, especially for use in the tea plantations.

Regarding bone meal it is interesting to note that although there is not at present any great demand for super-phosphates in this country, the experiments of the agricultural departments have proved that the application of this manure to the soil would have a very marked effect. If, therefore, it can be placed on the market in large quantities at a reasonable price, it is almost certain that the demand for it will in time become very great.

The Cutlery Industry

As has been shown in connection with the treatment of cottage industries, in the matter of our requirements regarding cutlery products Bengal still depends, to a very large extent, on foreign supplies. Recent experiments conducted and successfully concluded at the workshop attached to the Department of Industries, Bengal, in the processes of annealing,

hardening and tempering have opened out immense possibilities for the development of the industry on the lines of the cottage, the small-scale and the big industries.

Of the four major heads into which the industry can be conveniently divided, viz., (1) knife and scissors group ; (2) surgical instruments group ; (3) razor group ; (4) miscellaneous group—the razor group can be worked with profit as a small industry as also the knife and scissors group.

The demand for the products is considerable and various foreign countries profit by the trade.

Whenever there is a large middle class population the small industries have immense possibilities. The industry for the production of articles of the Razor Group can be started in every district town in Bengal and in most sub-divisions. There is every possibility of the success of 27 razor factories in the 27 districts of Bengal and about 100 factories for the production of knives and scissors.

The following table gives an idea of the approximate capital required for equipping a cutlery factory for producing razors together with an estimate of the approximate cost of production of razors of various sizes and qualities and workmanship. Costing charts giving necessary details have been prepared and are available at the Office of the Director of Industries, Bengal.

Razor Group

	Rs.
I. Capital Cost.	
A. Land :	
(1) Factory House 40' × 20' ...	... 1,000
(2) Godown, Store and Office shed ...	... 100
B. Laboratory Equipments ...	... 1,750
C. Prime Mover and Power Transmission	
Gears ...	... 1,500
D. Forging equipments and incidentals ...	... 750

	Rs.
E. Polishers' equipments and incidentals ...	540
F. Fitters' equipments and incidentals ...	900
G. Air conditioning and incidentals ...	900
H. Water conditioning and incidentals ...	200
I. Furnace (Heat treatment) '...	1,600
J. Electroplating	750
K. Erection and other incidentals ...	1,250
Total	<u>11,240</u>

II. Capital Expenditure.

	Rs.	A.
1. Interest on Capital invested @ $7\frac{1}{2}$ per cent. per annum ...	843	12
2. Depreciation @ 10 per cent. per annum	1,125	0
3. Repairs, etc. @ 5 per cent. per annum	562	8
Total	<u>2,531</u>	4
Monthly	210	12
Daily (25 working days) ...	8	7

III. Running Cost per day.

(a) *Productive Labour.*

	Rs.	A.	Rs.	A.
4 Forge Mistries @ Rs. 1/4	5	0		
4 Assistants @ As. 12	3	0		
4 Expert Cutlers @ Rs. 2/4	9	0		
8 Asst. Cutlers @ Re. 1	8	0		
2 Fitters @ Rs. 1/4 ...	2	8		
4 Asst. Fitters @ As. 12	3	0		
1 Hardener @ Rs. 2 ...	2	0		
1 Assistant @ As. 12 ...	0	12		
1 Expert Electroplater	2	0		
1 Assistant	0	12		
3 Boys @ As. 8 ...	1	8		
			<u>37</u>	8

(b) *Non-productive establishment (per day).*

		Rs. A.	Rs. A.
1	Technical Supervisor	7	0
1	Assistant	4	0
1	Expert Mechanic	3	0
2	Clerks @ Rs. 1/4	2	8
1	Office boy @ As. 4	0	4
1	Peon @ As. 8	0	8
1	Darwan @ As. 8	0	8
		—	17 12

(c) *Raw and consumables.*

	Rs. A.	
1. Steel 28 lbs. and incidentals @ Rs. 1/4 for every pound of steel	35 0	
2. Consumables @ As. 12 for each lb. of steel	24 0	
3. Office sundries	0 8	
	—	59 8
Total	Rs. 123 3	

Debit	Rs. A.	Credit	Rs.
Running cost per day	123 3	Sale of 25 lbs. of finished cutlery products @ aver- age Rs. 6 per lb. 150 (on the basis of 1.75 lbs. weight—one dozen of razors).	
Sales commission @ 5 per cent.	7 8		
Total	130 11		
Net profit	19 5		
Gross Total	150 0		
Net profit per day about	...	Rs. 19-0	
Net profit per month about	...	„ 487-8	

Salt

The importance of salt in the daily life of mankind in every stage of civilisation cannot be over-estimated. Salt is equally indispensable for industries, agriculture and animal husbandry. And yet Bengal is absolutely dependent on foreign countries and on other provinces of India for the supply of her salt. It is known that even in the early days of British connection, Bengal, with her long coast line, used to produce enough salt in her coastal districts not only for her own requirements but also for supplying the neighbouring provinces. Salt manufacture in those days used to be carried on mainly as a cottage industry ; occasionally it was a small industry when the output was meant for sale in the up-country. The ruins of evaporation tanks and various other allied structures can still be seen in the maritime districts of the Province.

The following figures for 1933-34 show the position of Bengal, relative to other provinces, in the production and consumption of salt :

				Production in Maunds
Northern India Salt Revenue Department				
(Rajputana, Salt Range, Kohat) ...				12,770,725
Madras	...	...	...	12,501,015
Bombay	...	...	...	11,116,997
Sind	...	...	...	1,362,334
Burma	...	...	...	974,918
Bengal	...	...	...	<i>Nil</i>

				Imports in Maunds.
			Foreign sea- borne salt.	Imports from Aden and other sources.
Madras	...	...	3,017	11,51,985
Sind	...	...	2,059	35,214
Bombay	...	...	5,377	1,07,189
Bengal	...	...	13,21,696	1,08,84,636
Burma	...	...	8,75,907	1,99,827

The figures show that Bengal is by far the largest importer and consumer of both foreign and non-provincial salt. It is true that the whole of this import is not meant for Bengal as the adjacent provinces like Assam, Bihar and Orissa are also supplied from these imports ; but still Bengal's consumption is large and increasing.

The details of the salt imported from Aden and Indian sources in 1933-34 are shown below :

				Maunds.
Aden	...	...	...	76,64,774
Karachi	...	...	...	8,46,291
Bombay	...	...	...	4,36,681
Okha	...	...	...	10,38,586
Nadir	...	...	...	3,46,320
Tuticorin	...	...	...	2,98,783
Navalakha	...	...	...	3,53,200

Bengal is thus absolutely dependent on foreign supply and whenever the suppliers had an opportunity in the past they squeezed Bengal, as in the 2½ years from the second half of 1926 to 1928. According to the finding of the Tariff Board on the salt industry, at least Rs. 1 crore extra was extracted from the consumers, mainly of Bengal, during that period. It has, therefore, become imperative that Bengal should be independent of foreign supply and this is more so, as the Province can produce ample salt in her coastal districts.

Government engaged sometime ago a special officer—one Mr. Pitt—to report on the prospects and possibilities of reviving the salt industry in the Sunderban area. Mr. Pitt reported that conditions were not suitable for salt manufacture in Bengal on a commercial scale. His arguments, however, lacked conviction and his studies of the various factors were incomplete. Subsequently the Government of Bengal published a note on the possibilities of salt manufacture in Bengal, incidentally describing what they had done up to the year 1933, in the direction of fostering the industry. They maintained in the note that of the four systems prevalent in the various parts of

the world, only the pit-brine method had any chance of success in Bengal and that they had asked the Government of India for the services of an expert to survey the sea board of the Province, particularly of the district of Midnapur with a view to finding out the possibilities of that method.

To us, it appears that given a little initial assistance not only this method—pit-brine method—may be successful in Bengal, but also there are great possibilities in the method of manufacturing salt from crusts which form on the sea-shore and the banks of rivers on the coastal area, as well as the solar evaporation method all along the coasts.

The second method—manufacture of salt from crusts—can be developed as a cottage industry, particularly in the Midnapur district, for supplying the local requirements. The salt obtained from the process, is not perfectly white but the average consumer does not grudge that. If, however, it is found desirable to make the product white, the Industries Department can evolve the necessary process for the purpose and teach the manufacturers the method of whitening the salt. Salt for local consumption can also be manufactured on a cottage industry basis from brine by either solar evaporation or by actual heating. The only important requirement is the provision of storing the salt, brought by individual producers. We have already mentioned about "village organisations" in connection with co-operative institutions. These organisations can provide storage facilities for the salt manufactured by the cottage industry of the locality.

Salt can be manufactured on a commercial scale by the solar evaporation method all along the coast. There are certainly difficulties but those are not insuperable. The brine in the Bengal coast is certainly not as strong as in Aden or in Western Indian coasts but its strength is certainly comparable to that of the Madras Coast, where a large amount of salt is manufactured. Works cannot also be carried on in the open throughout the year. But there are advantages too. First the transport charge will be less because of the proximity of the consuming market to the centre of production. This is parti-

cularly important as the incidence of freight on a low-priced commodity like salt is high. Secondly, the fuel in the coastal region is abundant and if sheds can be built up, artificial evaporation of the brine becomes possible and manufacture can be carried on throughout the year. Even in the open, manufacture can proceed for six months during the year, if not longer, in certain parts. An ideal place near Calcutta is the Frasergunge beach. The cost of fuel from the neighbouring forest is not prohibitive and transport to Calcutta can be cheaply effected by barges.

Calculation of the cost of production of salt by the evaporation method in Frasergunge and its transport to the Calcutta market show that the total charge cannot exceed annas seven per maund, according to a very conservative estimate. Even assuming that it is an anna more to begin with, the experiment is well worth trying.

The capital for a concern producing 250,000 maunds of salt per year should not exceed Rs. 50,000. If the combined solar and artificial evaporation process is utilised, the cost may be a little more, particularly for a suitable furnace and boiler.

In view of the immense importance of the commodity in the life of the Province and also from the consideration of prospects for relieving unemployment, Government should not only provide all facilities in the direction of licenses, rent and other factors, but should also ungrudgingly grant a little financial assistance in the earlier stages. Our suggestion is that if for any economic unit half of the capital is provided by the promoters, the Government should lend on easy terms the other half to enable the company to start work, of course, retaining adequate control over its accounts and activities. Most probably, even this help would not have been required in the normal course, but it is known and has been conclusively proved too, that outside competitors are determined to crush indigenous enterprise in Bengal at any cost, if necessary, even by dumping. If, however, they are made to feel that the provincial Government are behind these ventures, they would

certainly refrain from taking such measures, knowing full well that they cannot attain their objective.

The Government of the country have done many pioneer works in the direction of industry and agriculture. In the fitness of things they should also help the development of a salt industry in the Province. There are already a few concerns like the Premier Salt Manufacturing Company in the field, and Government should render all reasonable assistance to them after being convinced of their *bona fides*.

CHAPTER XIV

BIG INDUSTRIES

Soap Industry

It has been said that the consumption of soap in a country is a criterion of its civilisation. Soap, in some form or other, had been in use even in primitive times and had formed an important adjunct of toilet. The powdered gram, the turmeric paste and various other articles had been and are still being used for cleansing purposes, while the ash of the banana stem and fullers earth, etc., are still in use to serve the purpose of the washing soap. With changed conditions of living, the consumption of soap in Bengal is sure to go on increasing. As the demand for washing soap will go up with the increase of the labouring population, as a result of the industrialisation of the Province, so the demand for toilet soap is sure to go on increasing with the rise in the standard of living.

The statistics of the imports of soap into Bengal and India may be taken as a fair index of its use in the Province and the country. The only thing that must be taken into consideration in connection with these figures is that while some of the soaps imported into Bengal may be sent to the adjoining provinces which have no ports, Bengal gets large quantities of soap from other parts of India like Bombay and Mysore.

Import of Soap into India

I.—Household and Laundry Soap

	1928-29	1929-30	1930-31	1931-32	1932-33	1933-34
Quantity in Cwts.	...	342,343	383,656	287,127	244,730	244,874
Value in Rs.	...	1,02,05,035	1,11,06,215	75,89,570	48,69,170	44,40,268

II.—Toilet Soap

Quantity in Cwts.	...	47,701	50,862	32,354	43,812	52,016
Value in Rs.	...	49,83,303	50,43,197	31,24,496	30,86,666	31,97,069

III.—Other sorts

Quantity in Cwts.	...	15,841	13,421	12,841	7,799	6,583
Value in Rs.	...	6,21,687	5,18,994	4,84,169	3,07,036	1,99,995

IV.—Toilet Soap (Other classes)

Quantity in Cwts.	...	405,885	447,939	332,322	296,341	*303,413
Value in Rs.	...	1,58,10,025	1,66,68,406	1,11,98,235	82,62,872	76,37,362

Import of Soap into Bengal

I.—Household and Laundry Soap

	1928-29	1929-30	1930-31	1931-32	1932-33	1933-34
Quantity in Cwts.	...	31,878	33,057	25,472	15,660	25,556
Value in Rs.	...	11,58,767	11,80,005	8,46,305	4,04,221	4,27,767

II.—Toilet Soap

Quantity in Cwts.	...	13,530	17,105	8,413	15,878	14,298
Value in Rs.	...	12,92,435	14,66,539	7,08,930	8,55,404	7,59,912

III.—Other Sorts

Quantity in Cwts.	...	7,000	5,372	4,468	2,349	2,580
Value in Rs.	...	2,54,748	1,88,530	1,56,260	76,800	68,282

* Does not include Toilet Soap (other class).

Was the industry possible in India, was the question which occurred to many half a century back. But to-day it is an accomplished fact.

The Government of Madras was the first provincial Government to undertake the investigation of this industry departmentally and officially. The experiment was eminently successful and a Model Factory was started. This example was emulated by the Mysore Government, and the factory of that Government is fully equipped as a commercial concern. In Bengal private enterprise set the example and to-day we have some successful undertakings in the Province. But they cannot meet the demand ; and there is room for more factories. •

To make the industry a complete success the market must be regularly supplied with the best type of soap of uniform quality.

The chief basic materials for the manufacture of soap are oils, alkalies, fats, while colours and perfumes also are required, specially for toilet soaps.

India is the third largest producer of oil seeds in the world and there are certain oils such as cocoanut, groundnut, castor, mohua, etc. which are most valuable in soap manufacture. Formerly India used to export almost the whole of her output of oil seed. This export meant serious economic loss to India as the seeds were exported as raw materials and not the finished products. By exporting the seeds we not only lost the by-products but also had to import the oil and thus pay dearly for it. It was a double drain. Fortunately the oil pressing industry has been growing in this country and various kinds of oils are produced and are being made available for the soap industry. There are other unexplored sources of oil supply which deserve scientific investigation. If properly investigated, the oil industry can be revolutionised. To make the soap industry a really Indian industry, serious, systematic and scientific efforts must be made to organise the oil milling industry.

Even to-day we feel the want of mills in India which conduct the work of the separation of fatty acids and glycerine.

The supply of pure fatty acids will prove of immense help to small manufacturers of soap, working on cottage industry lines. It will save them the cost of a big plant required for the recovery of glycerine liberated in the settled boiling process of soap manufacture. Moreover, it will not only save an immense amount of labour but also save time required for this recovery and boiling. With pure fatty acids readily available, the whole operation of soap manufacture can be finished easily. The resulting soaps from such fatty acids will stand competition with the best imported soap as they will not sweat during the rainy season and will never deteriorate in shape and size. Generally speaking, there are three processes by which glycerine can be separated from the fatty acids; one is Auto-clave, the other Twitchell and the third is called the Enzyme. Every process has its particular advantages, the Twitchell process being the easiest as far as the glycerine and fatty acids separation is concerned. The resulting fatty acids are said to be dark in colour. Improvements are being made almost every year in all these processes.

Next comes the question of fats. The latest statistics of hide exports clearly prove that a large number of cattle is slaughtered in Bengal every year. The indigenous methods of the recovery of fat are anything but scientific, economical and up-to-date. By these crude methods, a large percentage of available fat is lost. Moreover, the fat recovered is not as pure as it ought to be. The methods, therefore, must be improved. This supply of fat will be of immense use in manufacturing soap, specially as fats are not generally used in India for edible purposes.

The next question of importance is the supply of alkalis which is truly called the life of soap. In this country we have an abundant supply of salt and crude alkaline earth for the preparation of soda ash and caustic soda. These articles are of immense value to other industries also, and every attempt must be made to manufacture them in Bengal. Our utter helplessness in this matter became apparent during the dark days of the Great War, when the price of these articles rose to six

times their ordinary price because of shortage of supply. There are ordinarily three processes in use, (1) Le Blanc, (2) Ammonia and (3) Electrolytic. In America they are using electricity for the manufacture of soda. In Bengal factories can be established where electric power is available. •

Soda silicate is now being manufactured in Bengal and will be available locally with increased and regular demand. But the soap factories should insist on this indigenous product being as pure as, if not superior to the imported article.

There are special colours for use in soap. They are usually of German make. During the War attempts were made to use some vegetable colours and experiments were conducted in the Indian Institute of Science at Bangalore. Researches should be continued with a view to make the industry independent of foreign supply as far as possible.

Then we come to the perfumes. There are two kinds of perfumes, natural and synthetic. We can easily secure an ample supply of natural perfumes in this land of flowers. But the perfume industry, like most of our old industries, is in a disorganised condition. And it is only with better equipment, up-to-date scientific and labour-saving plant that we can hope to establish it on a sound economic basis. For the synthetic products which are in general use, we must, for the present at least, depend on foreign countries.

The supply of cheap commercial alcohol, which is required for transparent soaps, must be assured. At present commercial alcohol is imported into India though there are many Government distilleries where it can be easily manufactured. The present price of alcohol is prohibitive, and till we produce alcohol, the Government should give a rebate of duty on all imported alcohol used for commercial purposes and issue licenses to *bona fide* manufacturers for redistilling it on easy terms, as without redistillation this will not prove paying.

In cheap soaps rosin is used, and the Government Turpentine and Rosin Factories at Chutterbuckgunj, Bareilly and at Jallao, Punjab are supplying large quantities of this material.

After the general treatment of the problems of this industry we come to the position and possibilities in Bengal.

Among the vegetable oils generally used in soap manufacture may be mentioned :—

- (1) Cocoanut oil
- (2) Groundnut oil
- (3) Castor oil
- (4) Mohua oil
- (5) Cotton seed oil

All these oils have to be imported from provinces outside Bengal, just as foreign soap manufacturers import them from India.

Among the minor sources of oil, the possibilities of which have been recently investigated into by the Department of Industries, Bengal, thanks to the able direction of Dr. R. L. Dutt, Industrial Chemist, Bengal, mention may be made of :

- (1) Kusum
- (2) Karanja
- (3) Neem
- (4) Rayna
- (5) Punna, etc.

These have hitherto been allowed to waste, though their utilisation would undoubtedly cheapen the cost of production of soap.

The oils and fats required for the manufacture of soap are easily and abundantly available in the Calcutta market at all seasons of the year.

To place the industry on a sound basis and to ensure a wide market for the product the technique of soap manufacture must be improved. The public must be convinced of the high quality of the soap turned out, so that they can have no hesitation in using them. The present unsatisfactory condition of the industry is due, to a large extent, to the diffidence of the public to use the country made soap because of the unsatisfactory quality of some of the soaps placed on the market—an observation which applies equally to washing and toilet soaps. The consumer must get the best value for his money.

Research must be continually carried on. Research into the technique of manufacture is as necessary to improve the quality of soap as that into the manufacturing processes to reduce the cost of production. Unfortunately Bengalee manufacturers, owing generally to the slenderness of their resources, have not yet seen the wisdom of employing chemists on their staff and have laboratories attached to their factories. If continued research work is not possible in every factory the manufacturers should combine to establish a central institute where chemists should conduct researches with a view to improve the quality, increase the output and decrease the cost of production of soap. The expenditure to be incurred in establishing and maintaining this institute may be met by contributions from the factories fixed according to their capacity of production. This aspect of the problem has been discussed in the chapter on Industrial Research.

Organised propaganda should be carried on to educate the public and induce them to use soaps produced in the Province. The superiority of the products should be demonstrated. It should be impressed upon the public that the washing soaps possess the requisite power of detergency to make the fabrics clean without injuring them and the toilet soaps do not harm the skin, being free from all injurious ingredients.

An intensive sales campaign on an extensive scale should be undertaken and men and women should be advised to use soap for the sake of health and not as a luxury. It is by this method that the demand can be increased. They may also be called upon to buy soaps produced in Bengal in preference to those produced outside the Province.

Besides individual manufacturers, who manufacture cheap washing soap, there are about fifteen soap factories in Bengal which produce high-class soaps. Unfortunately, reliable statistics regarding their total output cannot be secured. But it may not be unreasonable to surmise that there is scope for the establishment of many more factories to replace the imports on the one hand and to meet the growing demand on the other.

For some years to come, at least, there can be no fear of over-production and no demand for a restriction scheme. "

There are in Bengal manufacturers of washing soap who pursue the primitive method of manufacture. This indigenous soap industry has been in existence in Bengal for more than a century. Its origin cannot be traced. But from the name commonly given to the soap thus manufactured, i.e., Dacca Soap, it may be surmised that Dacca was the birth place of this industry. It is interesting to note that even now the majority of soap boilers come from the district of Dacca and the vicinity of Calcutta. Their products are sold locally, but their sales are brisk and the volume of trade is not inconsiderable.

Mention must be made of the numerous manufacturers of the "so-called" toilet soaps on a small scale. These soaps attract the simple people in the countryside, who are not judges of quality, by their gaudy colour, strong scent and ridiculously low price. These soaps are made from materials positively injurious to the skin and people should be warned against their use. Their discontinuance would make the factories free from unequal but cut-throat competition.

The manufacture of washing soap may be conducted on the cottage industry lines. And the factories scattered all over the Province can, by adopting improved methods of manufacture evolved by the Department of Industries, Bengal, still hold their own in the local markets. But the manufacture of toilet soaps of standard qualities can be profitable only on a factory scale.

The old methods of manufacture and marketing should undergo change. Soap manufacturers should study the trend of taste and study the latest scientific and technical improvements evolved in other countries with a view to adopt them.

Calcutta appears to be the most convenient centre for starting soap factories, though there is an abundant possibility of starting them in big mofussil towns, with distributing centres at places like Dacca, Chittagong and Burdwan.

Looking ahead we would like to say that when more

factories have been started in Bengal it may be necessary to minimise internal competition by co-ordination among some factories—some of them specialising in the manufacture of some kinds of soap and others in other varieties.

The manufacture of washing soap can be undertaken on the lines of the cottage industry.

Below are given two schemes—one for the manufacture of washing soap by the Grained Process, as also cheap washing and toilet soaps by the Cold Process, and the other for the manufacture of washing and toilet soaps on a big scale.

Scheme for the manufacture of washing soap by the Grained Process as also cheap washing and toilet soaps by the Cold Process :

	Rs.	A.
Pan		
(1) 72" × 36" (round)		
(2) 72" × 42" (cylindrical)	...	350 0
Soap frames (wooden)		
(1) 18" × 18" × 15" wide—2		
(2) 22" × 19" × 15½" wide—2	...	150 0
Slab, bar and piece cutting machines		350 0
Stamping Press	...	250 0
Erection charges	...	400 0
Total	...	1,500 0
Plant and Erection charges	...	1,500 0
Building	...	1,000 0
Working Capital	...	1,500 0
Total	...	4,000 0

Scheme for a regular and up-to-date plant for the manufacture of washing soap on a large scale. Output 60 tons per month valued at about Rs. 24,000 or Rs. 3 lakhs a year

One Boiler, preferably locomotive type 60 N.H.P. 5,000 lbs. water evaporation per hour. A Lancashire Boiler of 6,000-7,000 lbs. water evaporation will cost the same	...	7,500 0
One Steam Pan 10' × 7' × 6' with Krull Coils gross capacity 36,000 lbs. soap capacity 6,000 lbs.	...	2,500 0

	Rs.	A.
One Steam Pan 10' × 10' with Krull Coils, Gross capacity 44,000 lbs. soap capacity 7,000 lbs. ...	3,000	0
One 7,000 lbs. Houchin Perfection Crutcher 6' × 6' to settle the entire output of either pan ...	6,000	0
Wooden frames Forshaw design 22" long × 19" high × 15½" wide 20 frames ...	1,000	0
Standard English Frames 45" long × 57" high × 15½" wide 5 frames ...	1,000	0
Forshaw's Hand Slabbing machine ...	200	0
Forshaw's Bar cutting machine ...	600	0
Forshaw's Cake cutting machine ...	600	0
Ovens for frosting soap cakes steam, Krull or Simon ...	2,000	0
Miscellaneous fittings, pumps and erection ...	2,000	0
Total ...	26,400	0

II. Packing—Board-box and Case making :

One 60 N.H.P. Semi-Bitumenous Producer plant with Engine to be fired with wood & coal rejections ...	7,000	0
(a) One 48" Saw Table for logs ...	1,500	0
(b) One 14" Saw Table with 16½ Cross Cut Table ...	600	0
(c) One Hand Shear, one Power Scorer, One Power Corner Cutter, One Corner Stitcher, One Box Printing Machine ...	7,000	0
N. B.—To run either (a) or (b) & (c) at a time big enough for an output of 1 lakh rupees worth of soap per month.		
Total ...	16,100	

Summary

	Rs.	A.
Plant etc. ...	41,900	0
Building and fittings ...	14,100	0
Advt. & no-profit stage ...	14,000	0
Working capital ...	30,000	0
Total	1,00,000	0

- (B) Scheme for a Toilet Soap plant, (model of the highest quality and finish: Output valued at, say, Rs. 24,000 per month which can be doubled by installing a second pan and increasing the steam capacity of the plant).

Plant :—

One 12' x 12' Soap Kettle with fittings complete Krull's ...	4,000	0
Ten English Frames Standard— Forshaw or Bruce Hyslop ...	2,500	0
One Lehman Chipping Machine ...	600	0
One Soap Chip Dryer, Simon A.G. ...	2,000	0
One Weber and Seelander Colour and Perfume Mixer ...	1,000	0
One Baker and Perkins Perfecta— Three Roll Mill Steel Rolls Size C Rolls 31" x 16", weight 76 cwts. ...	6,000	0
One Baker and Perkins Plodder Type 12B ...	5,000	0
One Weber and Seelander Semi-automatic Stamping Press ...	2,000	0
30 H.P. 440 volts Motor with electric installation ...	2,000	0
Total ...	25,100	0

Summary

			Rs.	A.
Plant	...	...	25,100	0
Additional Building	...	...	9,900	0
Advertisement and no-profit stage			15,000	0
Working capital	...	...	30,000	0
			<hr/>	
Total	...	...	80,000	0
			<hr/>	

Thus a Capital of Rs. 2,00,000 will be required to erect the most up-to-date plant to produce both washing and toilet soaps of the highest quality and finish and maintain it till it has passed through the no-profit stage of creating consumer's demand and finally come to a profitable position.

A profit of 20 per cent. can be expected from soaps sold.

The Hosiery Industry

The importance of the hosiery industry and its possibilities justify us in establishing it as a big industry, if only to keep about a crore of rupees in the Province annually which we spend on imported hosiery goods.

At present the industry labours under the following difficulties :

- (1) High price of raw materials.
- (2) Financial difficulty.
- (3) Dearth of skilled labour.
- (4) Unrestricted sale of unstamped foreign goods as "Indian products."
- (5) High electric charges.

The unrestricted sale of unstamped foreign goods as "Indian products" can now be controlled under the law and no longer proves an insurmountable obstacle in the way of the development of the industry in Bengal.

It is for public opinion to press the necessity of making the electric supply concerns reduce their charges for industrial purposes.

Financial difficulties present a problem which can be solved only when the policy of industrial financing through banks—industrial or otherwise—is developed. In a subsequent chapter the question of financing of industries has been discussed in detail. Two points remain to be considered.

The greatest difficulty is of course with regard to the supply of the raw material. The organisers of the industry in Bengal are willing, nay eager to use Indian yarn if it is made suitable for their purpose. Unfortunately, the Indian cotton mills are chary to undertake the manufacture of yarn suited to the requirements of the hosiery industry. It stands to the credit of more than one Bengal hosiery factory that in spite of the comparative unsuitability of the Indian yarn for the purpose they are making a determined effort, under very adverse circumstances, to produce hosiery goods from ordinary hand twisted Indian yarn meant not for knitting, but for weaving purposes. To make this yarn suitable for the manufacture of hosiery goods they have first to break the twist of the yarn by a specially devised machine which has been designed to serve the purpose, and then to wind it up again in the form of a cone—the processes being laborious and expensive. "Still the use of cheap Indian yarn has made it possible for them to market their products at Rs. 7 per dozen; and if the laborious and expensive processes are eliminated and proper Indian yarns are made available to them they can offer their products at a much lower price."

An enquiry revealed the fact that only twenty-four factories in Bengal consume about 801,600 lbs. of yarn annually. There are other factories of which detailed particulars are not available. So the quantity of yarn consumed by the hosiery factories in Bengal is by no means negligible. If this fact is brought to the notice of the cotton mills in the Province some of the progressive mills would not hesitate to produce yarn suited to the requirements of the hosiery industry. If the factories can secure cheap raw materials it will go a long way to help them in the struggle they are engaged in. They should not be left to the mercy of foreign producers of yarn.

At present we must remain satisfied with imported knitting machines though their production in the country would be of great advantage to us. But time is not fully ripe for manufacturing knitting machines. We hope, however, that the time will soon come when in the matter of machines also we will no longer have to depend on foreign supplies.

The local industry is also handicapped on account of the dearth of skilled labour. There is demand for two different types of trained men, *viz.*:

- (a) Ordinary skilled labour trained in particular processes,
- (b) Educated intelligent men who can take entire charge of the factory and thus make it possible for the proprietors to concentrate their attention on the business side.

To remedy these and other deficiencies it is desirable to start in Calcutta a Hosiery Institute not only for research and investigation work but also for training young men.

A scheme for a big hosiery factory is given below:

Plain Underwear Fabrics

Large diameter circular knitting machines for plain and plated tabular fabrics consisting of—

1	Machine	11"	dia.	6	feeders	622	needles.
1	"	12"	"	8	"	678	"
1	"	13"	"	8	"	734	"
2	Machines	14"	"	8	"	792	"
2	"	15"	"	10	"	848	"
3	"	16"	"	10	"	904	"
2	"	17"	"	10	"	960	"

Circular Rib Top Machine for making ribbed ends.

Precision Winding Machine for winding from cops on to bottle-shaped bobbins
192 spindles with 500 wooden bobbins.

Precision Cone Winding Machine.

Total value of the above Rs. 56,000.

	Rs.
Complete Bleaching Plant, including one <i>kier</i> , with Lye heater, etc.	
Drying Machine, Chamber type, with rollers of zinc iron.	
One High Glaze Fabric Calendering Machine ...	18,000
Sewing Machines	12,000
Electric motors, shaftings, pulleys, belts, blocks, etc.	5,000

Total 91,000

Working capital (in buying yarn) -

*Say 10,000/-
10,000/-
20,000/-*

The machines can be easily run for 20 hours; hence an outturn of about 476 dozen banians of 18" to 44" may be obtained.

Total power required for the whole plant is 15 H.P.

Total number of men employed in the whole mill will be approximately 100.

Yarn required in 10 hours would be about 600 lbs. and in 20 hours 1,200 lbs.

Réceipt side
(per day)

Expenditure side
(per day)

	Rs.		Rs.
476 dozens	Rs. 4 per	Labour 100 men @ Re. 1	
dozen	1,904	per day	100
		1200 lbs. of yarn @	
		As. 8 per lb	600
		Other charges e.g.,	
		power, chemicals etc.	50
		Interest on Rs. 2,00,000	
		@ 6¼ per cent. per	
		annum	40
		Depreciation 10 per	
		cent.	30
		House rent, etc. ...	50
		Petty contingencies ...	50
Total ...	1,904	Total	920

Ceramics

That department of plastic art which includes the production of all objects formed by moulding, modelling and baking clay, such as vases, bas-reliefs, cornices, cups, articles of porcelain, terra-cotta, and pottery in general is known as ceramics.

Pottery making may be said to be the most useful, universal and certainly one of the oldest, if not the oldest, industry. Its birth lies in the pre-historic period of history when the primitive man fashioned rude pots for his domestic purposes since when it has been the necessary adjunct of developing civilisation. It is a far cry from the almost shapeless pots found in the dwellings of the Palæolithic man to the beautiful products of Sèvres, or the works of art of the old Chinese and Japanese masters ; but all owe their origin to the accident that discovered the firing properties of clay. When the savage, who cooked his food in a calabash or a gourd, smeared with clay, found that contact with fire hardened the clay, he had started a new industry, indispensable to daily life.

The history of a country is to be found in its pottery and where palm leaves and parchment have crumbled the clay tablet has survived and many a potsherd or inscribed tablet, defying the destruction that time brings about, has enabled the antiquarian to tell us the life story of a bye-gone people. The evolution of earthen-ware is a long and interesting history. That the early Egyptians like the people of Babylon and Ninevah had mastered the secret of the plastic possibilities of clay and of glazes is evidenced from the figures, tiles, etc., found in the Egyptian tombs. But the evolution of pottery in other countries had left India practically untouched and the Indian village potter now uses the same implements and methods and turns out almost the same pots and pans as did his ancestors in the days of the ancient Indian epics and the potter's thumb may be said to have retained the same skill and limits.

"The making of pottery in India," it has been aptly said, "is a simple affair and the implements required few and portable." The potter is a picturesque subject as he squats under a tree turning his wheel, "with the clay population round in rows." The local mud is beaten to a smooth floor, and a pin, either of wood or metal—driven into it, on which to spin his wheel; and his workshop is ready. His clumsy method of turning the wheel by means of a stick, involves a large waste of time and labour, but it has never dawned on him, apparently, that the use of a rough fly-wheel, turned by one of his numerous family, would enable him to produce double the amount of work.

The Moghuls decorated their mosques and buildings after the example of Persia, Mesopotamia, etc., with artistic tiles of fine colour and design, but it was an art imported from Persia, and, on the decay of the Moghul power, it found little or no demand in India, and has almost died out, only a small industry being still carried on in Sind and Multan and a few other places. In modern times the potter's art has developed into a vast and varied industry in Europe, America, China and Japan. The old method of making a few household utensils has given place to a new system of manufacture which produces with scientific and economic efficiency various classes of articles having a wide range of usefulness. The quantity and variety of ceramic products required for various purposes to-day demand a clear classification for grouping together all pottery ware having similar properties. The distinctive characteristics which differentiate the articles can be divided into two principal groups, *viz.*, Permeable Pottery and Impermeable Pottery.

Permeable pottery has three subdivisions:

- (a) Terra-cotta, which comprises bricks, tiles, the ordinary pottery used in the country such as cooking utensils, jars, water pots, tubs, etc.
- (b) Refractories such as fire bricks, muffles used in metallurgical industries and gas works, pots and crucibles of the glass makers, the tiny nozzles of

the incandescent gas lamps, silica, chromite, bauxite, magnesite bricks for lining industrial furnaces.

- (c) Earthenware including all permeable pottery with a coating of glaze. Tea and table articles, wall tiles, and various other articles of daily and domestic use fall under this category.

Impermeable pottery has two subdivisions :

- (a) Stone-ware comprising sinks, battery jars, sanitary pipes, paving tiles, etc.
- (b) Porcelain *i.e.* all translucent pottery covered with glaze such as tea and table ware, electric insulators, basins and crucibles of chemical laboratories, etc.

India has hardly made any progress in such an important industry. The needs of the villagers have been simple in the matter of earthen vessels. And it is only during the last twenty years or so that there has grown up a demand for glazed pottery, which is imported in large quantities from foreign countries throughout the year. With a slow awakening to the possibilities of Indian clay and the steady development of Indian industry a change is likely to be seen in course of a few years. Though the manufacture of glazed pottery has not been unknown in parts of India, where it is a cottage industry producing artistic articles, its development on modern lines has been very poor. Indeed India is now the most backward country in the world in pottery making, in spite of the fact that all the raw materials are ready at hand. All kinds of clay can be had for the mere labour of digging, coal is available in plenty and skilled labour is not wanting. It seems an anomaly that a country so favourably situated should have so long been dependent on foreign imports for one of its commonest needs. There is no reason why she should not also compete successfully with Japan and Staffordshire in the export of earthenware. Naturally a large output is impossible without the requisite machinery, which is beyond the scope of the village potter, who can only adopt improved implements to improve his outturn and the variety of the articles he produces

but the erection of potteries in every district, where suitable clay is to be found, should attract and focus the necessary labour and employ men, women and children as in Staffordshire.

Speaking of raw materials it may be interesting to know that the report and recommendations of the Commercial Intelligence Committee of the Board of Trade (Great Britain) issued by the President of the Board of Trade in February, 1916 revealed the interesting and surprising fact that Germany, which had exported large quantities of ceramic goods to India before the Great War, had depended largely on clay from England though, thanks to the German system of State aid carefully manipulated, German potteries received Devon and Cornwall clays at three shillings a ton cheaper than the rate at which they transported the clays to British potteries.

The advance made in India in the manufacture of glazed pottery, as has been said before, is still very poor and much remains to be done. The few factories that exist at present have been able to touch only the fringe of the requirements in glazed pottery for industrial and domestic purposes and we have still to depend largely on articles imported from abroad. Given necessary encouragement and facilities, there is hardly any reason why Bengal should not be able to produce glazed pottery to meet the requirements.

The different classes of pottery that can be conveniently manufactured in Bengal are as follows :

- (1) Porcelain and allied products, *e.g.*, electrical insulators, laboratory porcelain, art porcelain, etc.
- (2) Glazed earthenware or China, *e.g.*, tea and table-ware, hospital requisites, druggists requisites, etc.
- (3) Glazed wall tiles.
- (4) Glazed sanitary ware, *e.g.*, wash basins, pans, etc.
- (5) Chemical stone-ware, *e.g.*, acid jars, pickle jars, ink bottles, etc.
- (6) Salt glaze stone-ware, *e.g.*, drain pipes, channels.

Of the unglazed pottery the manufacture of the following can be developed :

- (1) Fire bricks and refractories.

- (2) Wire-cut bricks, paving and roofing tiles.
- (3) Terra-cotta figures, pannels, *i.e.*, art terra-cotta, etc.
- (4) Building bricks manufactured by modern processes.

West Bengal offers almost unique facilities for the development of this industry. All the necessary raw materials suitable for the manufacture of high class glazed pottery can be had from the adjoining districts of Bihar and some in Bengal proper in the district of Burdwan. Abundant supply of fuel can be had from the Ranigunj Coal Fields. Calcutta provides perhaps the best market for the sale of the products. Skilled workmen are not wanting and advantage can be taken of the modellers from Krishnagar in the district of Nadia where hereditary modellers and potters have been famous throughout India for decorated terra-cotta potteries and figures. For the manufacture of unglazed pottery such as bricks, paving and roofing tiles, terra-cotta, etc., everything necessary is at hand in the districts of Western Bengal where the pottery industry can be developed both as a cottage and as a big industry.

East Bengal, excepting the districts of Chittagong and Tipperah and places bordering the Himalayas, is all alluvium. Hence raw materials required for the manufacture of high class glazed pottery cannot be obtained there. China-clay, felspar, quartz, fire clay, etc., have been found in the districts of Chittagong and Tipperah but even if these may be available, there is some difficulty in the supply of cheap fuel which counts in the cost of production of the manufactured articles. But the subject is worth investigating. East Bengal and Assam form one of the biggest markets in India for the sale of glazed earthenware articles such as rice and soup plates, rice bowls, dishes, tea cups and saucers, etc., which are extensively used by the Mahomedan population—the Moslems being in a majority in these parts. The import of these articles from Japan and Holland into the port of Chittagong is by no means inconsiderable.

The important raw materials that are necessary for the manufacture of high class glazed pottery are :

- (1) China clay

- (2) Bull clay
- (3) Felspar
- (4) Quartz
- (5) Limestone
- (6) Fireclay
- (7) Fuel (coal)

For the manufacture of unglazed pottery good plastic alluvial clay and river sand are the important materials. In the firing of terra-cotta, wood fuel, which can be easily secured from the Sunderbans, may be advantageously used.

The approximate capital (including working capital) necessary for economical units of high class glazed pottery factories on a commercial scale can be stated to be as follows :—

Fire bricks and refractories	...	Rs.	30,000
Chemical stoneware	...	„	50,000
Porcelain insulators	...	„	1,00,000
General earthen ware with glazed wall tiles	...	„	75,000
Sanitary ware	...	„	65,000

The import machineries required are :—

- (1) Stone breaker
- (2) Edge-runner mills
- (3) Wet-grinding cylinder
- (4) Filter press and pump
- (5) Clay kneading machines
- (6) Pugmill and extension presses
- (7) Throwing wheels, jigger and jolleys
- (8) Piller presses for pressing, etc.

The approximate cost in relation to the capital expenditure is—

Machinery	about 30 per cent.
Building	„ 20 to 25 per cent.
Kiln	„ 15 per cent.
Power plant, furniture, miscellaneous contingencies	„ 30 to 35 per cent.

A working capital of at least 25 per cent. of the total capital should be reserved.

The general type of kiln used for the burning of glazed pottery is a round down draft type, from 8' to 16' in diameter, single or double chambered, connected with a chimney. The kiln usually has 6 fire places.

Other types of kilns that are used for large-scale production are :

- (1) Gas-fired chamber kiln
- (2) Gas-fired tunnel kiln for continuous firing
- (3) Electric muffle kiln for continuous firing.

This kiln is used with advantage now-a-days for the decoration of glazed pottery.

Glass Making

Archaeological explorations have resulted in the discovery of a number of glass vessels which testify to the existence of the glass industry in ancient India. What he terms "Indian glass," is mentioned by Pliny as being of superior quality, which he attributes to its manufacture from crystals. It can be safely asserted that in the sixteenth century it existed as an established industry producing a very inferior material, utilised almost entirely for the manufacture of bangles, the demand for which was, and still is, almost universal, and to a very limited extent, for small bottles and flasks. Buchanan, in his journey through Mysore at the beginning of the nineteenth century, studied the art of glass making prevalent at the time and described the furnace used as "extremely crude".

The manufacture of glass and glass articles in modern factories in India is less than half a century old and one of the pioneer efforts was made by Bengal when a few gentlemen combined to start a factory at Sodepur near Calcutta. It was organised on a big scale and an expert was requisitioned from Germany who refused to teach Indians the art of glass making. A large amount of capital was wasted on the venture. "But" as Sir Alfred Chatterton has said, "the industry seems to have had a peculiar fascination for Indians, who undeterred by the

failure of comparatively large concerns run by Europeans, started 16 glass factories on a small scale between the years 1906 and 1913."

Prominent among these was the Telegaon factory under the aid of the Paisa Fund which was paying its way on the somewhat peculiar and non-commercial lines on which it was run.

The dependence of India on foreign countries in the matter of glass and glass articles became painfully apparent when the Great War broke out. When the proposal to appoint the Industrial Commission materialised it was understood that the Commission would make particular enquiries with reference to glass making, the manufacture of matches and oil crushing. It was realised that there was a tremendous demand for glass goods. Hundreds of thousands of Indians, particularly villagers, use as their only means of illumination small kerosene hand and hanging lamps. For all these glass globes are required, and when the supply from Belgium was practically stopped the Government thought that the opportunity had arrived to promote glass making as an industry in India.

Before the outbreak of the War the bulk of the imports of glass and glassware into India used to come from Germany and Austria. When trade with these belligerent countries ceased, Japan made giant strides to capture the trade. After the commencement of the War, in spite of the unusual rise in the prices of these articles, there was a marked falling off in the value of the imports from £1,297,000 in 1913-14 to £643,000 in 1915. While India failed to utilise her raw materials for the manufacture of glass, Japan took splendid advantage of the opportunity and supplied our market with the commodity in 1915-16 of the value of £400,000 against £131,000 in 1914-15 and £105,000 in 1913-14. The imports from the United Kingdom rose during the period by £20,000 to £160,000. Of the total glass imports into India at the time 22 per cent. consisted of bangles, 18 per cent. of funnels, globes and glass parts of lamps, 16 per cent. of sheets and phials, 10 per cent. of beads and false pearls and 6 per cent. of tableware. Before the War India used to import lampware from Germany to the extent of 41 per

cent. and from Austria-Hungary to the extent of 28 per cent. whereas England sent out only 7 per cent. In 1917-18 even that percentage dwindled to 6, while Japan's exports of glass rose to 90 per cent.

In his *Notes on the Industries of the United Provinces* (1908) Sir Atul Chatterjee devoted a chapter to the glass industry describing the four branches, (1) manufacture of crude glass or *kanch*; (2) manufacture of glass bangles or *churis* from the crude glass; (3) manufacture of flasks, ink-pots, etc., blown or moulded from crude glass; (4) manufacture of lamp chimneys, vases, etc., from broken imported glass and made definite suggestions for improvement of the cottage industry, as also of modern factories. He pointed out that the furnaces built at the modern factories were not up-to-date from the scientific point of view.

Ten years later in June, 1918, the *Pioneer* announced that the Glass Expert to the Government of the United Provinces had recently built an open gas fire regenerative continuous tank furnace at the Allahabad Glass Works, Naini. Wrote the *Pioneer*:

"The furnace has been working for over a month and is said to be very satisfactory. It possesses a great many advantages over the old type of direct fired furnaces. The capacity of the new furnace is much larger. It does not require as much labour and the smelting is done much more quickly. In the old type of furnace the expense arising out of the breakage of crucibles has always been great. In the tank furnace no crucibles are required at all. The consumption of coal is about 50 per cent. less. It gives uniform glass and is in every respect a great improvement on the direct fired furnace. It is to be hoped that this furnace will inaugurate a new era in the glass industry of this country. The cost of the furnace is Rs. 40,000 and it is capable of dealing with 150 maunds of raw materials in 24 hours."

It is easy to understand, therefore, why Sir Alfred

Chatterton, after referring to Sir Atul Chatterjee's account of the state of the glass industry, remarked in 1919 that,

“Comparing the state of things as described by him with the present condition of the industry it is evident that substantial progress has been made during the last ten years.”

The Government of the United Provinces had not only employed a glass expert but had also helped the industry in other ways. In 1915 Mr. A. H. Silver, Director of Industries of the province, published his note on the steps taken by the Local Government since the outbreak of the War to assist the development and expansion of local industries. We give the following extract from the note :

“Steps have been taken to recruit two glass experts from Europe to assist the local industry. A subsidy has been proposed to be paid to the largest glass works in the United Provinces for the training of apprentices. . . . Application for financial assistance has been made in connection with a new glass factory to be established in the Moradabad district and is being favourably considered by Government. . . . A co-operative society for bangle makers in Ferozabad is in course of construction and the Government of India have been asked to sanction a loan to them upon favourable terms. Some of the glass makers reported difficulty in getting iron moulds for chimneys, etc., and the Director of Industries has arranged with local engineers for their manufacture. Glass-makers were short of oxide of cobalt and of bichromate of potash. Special investigations were conducted with a view to obtaining oxide of cobalt in India, and this has been found practicable ; but ample supplies are now forthcoming from England at a reasonable price and bangle makers have been placed in touch with the suppliers. The manufacture of bichromate of potash has now been commenced and Government have provided the experimental manufacturer with a subsidy of Rs. 200 per mensem for 10 months to pay for the

special supervision needed. Government have also secured from the railway a very favourable rate of freight on the chromite ore from Baluchistan in order to render this business practicable."

Enquiries made in the Calcutta market have elicited the following information :

(a) No Sheet or Plate glass is manufactured in Bengal, although some quantity is manufactured in the U.P.

(b) Glass bangles are mostly imported but some quantity is manufactured in the U. P. by small-scale factories. It is said that about 20,000 hands are employed there in the glass bangle making factories. One Jagat Narayan Gouri Sankar of Ferozabad, Agra is the principal exporter there. As the result of an attempt made by some people, some bangles are now made at "Ghose Bazar", Chitpore, Calcutta. The principal raw material used is the broken glass purchased from the market at Rs. 2-8- per maund.

(c) Beads and false pearls are reported to be totally imported, there being no manufacturing concern in India.

The Government of Madras had been manufacturing soda water bottles, etc., and in March, 1917 a committee was appointed to examine the position and advise Government whether or not experiments in the manufacture of these bottles should be continued and, if not, whether an experiment should be made with other forms of glassware.

The Indian Industrial Commission arrived at the following conclusion regarding the glass industry in India :

"The glass industry, even in its simplest form, is highly technical and can be efficiently carried on only by scientifically trained manager and expert workmen. The present stage has been reached by importing men, only partially equipped with the necessary qualifications, from Europe and Japan and by sending Indian students abroad to pick up what knowledge they can. The glass industry is a closed trade and its secrets are carefully guarded, so that the latter method has not proved conspicuously successful."

Since the above was written the industry has made further progress. The condition of the industry in 1915 would be apparent from the following statement made by Sir Nicholas Beatson-Bell in the Bengal Legislative Council :

"The House is aware that quinine is sold by Government in glass tubes in all the mofussil post offices. These glass tubes are required annually by the Inspector General of Prisons to the extent of 10 lakhs of tubes. Before the War he got them from an Austrian firm through the India Office at Rs. 9-1- a thousand. When the War broke out Col. Buchanan saw that he could no longer get his supply from Austria. He was very anxious to place his order upon the Indian market. He wrote to all the firms, European and Indian, manufacturing glass in India. The lowest offer that he could get was Rs. 62-8- a thousand against Rs. 9-1- which he had previously been paying. . . He was, therefore, compelled to obtain his supply from England at Rs. 22-6- per thousand."

The position is no longer as bad as that. As a matter of fact Indian glass factories are now competing and can compete successfully on fair terms with Japan which produces articles at prices which almost defy competition.

But even now the import of large quantities of glass and glassware, as will be evident from the table on the next page, gives the value of the trade in glass and glassware in Bengal alone.

But Bengal is favourably situated for the manufacture of glass. In the glass industry there is but little waste of the raw materials in the process of manufacture, whilst a cheap supply of coal is undoubtedly an important factor. Ideal conditions for the manufacture of glass would be realised, if suitable sand can be found in proximity to the coal-fields. The two most important items in the cost of making glass in India are (1) coal and (2) soda ash. The coal is cheaper in Bengal, and a glass factory stands a better chance of surviving when situated in Bengal.

Statistics of Sea-borne Trade in Glass and Glasswares

	Import.				
	1927-28	1928-29	1929-30	1930-31	1931-32 :
	Rs.	Rs.	Rs.	Rs.	Rs.
Bangles	26,42,278	22,34,603	20,86,603	11,32,705	6,82,936
Beads and False Pearls ...	10,69,116	11,20,073	12,63,934	5,28,107	3,64,199
Bottles and Phials	10,86,101	10,84,313	14,03,115	10,47,975	7,35,755
Funnels, Globes and Glass parts of lamps	20,643	15,974	11,902	13,493	13,096
Table-ware including Decan- ter and Tumblers	49,426	56,344	1,31,845	91,756	42,098
Sheets and Plates	7,59,762	8,38,649	7,94,063	6,79,397	4,54,696
Other Glass Wares	18,77,795	15,45,775	14,29,697	11,06,078	9,28,825
Total	75,05,321	74,49,822	77,04,864	49,48,257	33,72,637
Government Stores Imports Bottles and Phials		7,634	15,448	19,364	800
Others		63,322	58,363	62,316	42,702
Total		70,956	73,811	81,680	43,502
Export		5,781	8,301	2,535	2,290
Government Export		260	75	200	
					6,450

The Review of the Trade of India in 1932-33 shows that the total value of the imports of glass and glassware amounted to Rs. 142 lakhs as compared with Rs. 122 lakhs in 1931-32. Almost all the important descriptions under this head recorded improvements. Of the principal countries participating in this trade Japan retained the foremost position and the value of her supplies advanced to Rs. 65 lakhs in 1932-33 from Rs. 42 lakhs in 1931-32. Belgium and Austria also improved their respective positions, the value of their shares being Rs. 15 lakhs and Rs. 2 lakhs as against Rs. 13 lakhs and Rs. 1 lakh a year ago. Consignments from the United Kingdom, Germany and Czechoslovakia were valued at Rs. 12, Rs. 18 and Rs. 23 lakhs as compared with Rs. 13, Rs. 20 and Rs. 23½ lakhs respectively in 1931-32. Imports of glass bangles showed an increase from Rs. 34½ lakhs to Rs. 40 lakhs and those of beads and false pearls from 15,500 cwts. valued at Rs. 9½ lakhs to 22,700 cwts. valued at Rs. 12½ lakhs. The principal sources of supply for both these classes of articles were, as usual, Czechoslovakia and Japan, the share of the former being Rs. 16 lakhs and Rs. 4 lakhs and of the latter Rs. 22 lakhs and Rs. 6 lakhs under the two respective heads. Imports of sodawater bottles, received, as usual, chiefly from Germany and the United Kingdom, numbered 29,000 gross (Rs. 6 lakhs) while bottles of other descriptions amounted to 781,000 gross (Rs. 18 lakhs).

When the imports are increasing Bengal should make an effort to check the increase and capture the markets of India.

The presence of the refractory materials and labour necessary in India dispels apprehension regarding the essential conditions of successful manufacture, and we have in Bengal to-day at least 17 factories manufacturing glass and glassware.

The following materials are generally used in handmade bottles :—

Sand,
Soda ash,
Limestone,
Arsenious Oxide.

They are not more easily available in Japan than in Bengal. That Bengal consumes a large quantity of glass every year will be evident from the significant fact that at the time of writing there are as many as 62 wholesale dealers of glass and glassware in Calcutta who hold a large stock of goods.

In his *Notes on Glass Manufacture* Mr. C. S. Fox of the Geological Survey of India pointed out that the field of glass manufacture is attractive even from a business point of view, and with the establishment of several carefully located glass works not only would Indian demand be met, but the whole eastern market would, in course of time, be supplied with glassware. What is wanted, he said, is State aid and public enterprise.

That public enterprise is not wanting is evident from the number of factories already working and from the remark of Sir Alfred Chatterton quoted before. State aid has come to the industry in the United Provinces and Madras and there is no reason to doubt that the Government of Bengal will be only too glad to render the industry any help it may require.

We have referred to the Committee appointed by the Madras Government in 1917. That Committee recorded the opinion that experiments should not be undertaken unless the Department of Industries was satisfied that it was likely to develop into an industry in the Province; it even deprecated the inception of any experiment in glass making unless expert assistance was assured. The Committee recommended that a survey should be made, by the Department, of alkaline earths in the Presidency, and samples of these earths should be analysed with the object of determining whether commercial alkali could be obtained from them.

The Committee also suggested that a preliminary survey should be made of the bangle industry in the Presidency and, in the light of information obtained by the survey, it should be considered whether the Department could do anything to assist the industry.

In Bengal, some portion of pioneering has been done by the public. But much still remains to be done. As Peddie

has said in his book *Defects in Glass*, "workmen should be encouraged to report at once any imperfections in the glass they handle, in no circumstances should they be allowed to attempt to remedy such imperfections without proper supervision." That is the work of the expert. Prof. W. E. S. Turner, Professor of Glass Technology, University of Sheffield, has pointed out that there are not infrequently occasions on which a defect may arise from a series of causes and judgment and experience are needed if the real cause is to be isolated.

It is necessary, therefore, to establish a research institute for glass, like the Bengal Tanning Institute at Calcutta and the Silk Weaving Institute at Berhampore, for researches connected with leather and silk respectively. This proposed Institute should undertake :

- (1) A preliminary survey,
- (2) Analysis of raw materials,
- (3) Fixing of suitable centres for the industry,
- (4) Research,
- (5) Experiment with indigenous raw materials.

The reports of the Geological Survey would be of immense help in the work. And the Institute should, in course of three years, be in a position to advise the industry in every matter connected with the manufacture of glass and glassware. The factories should look up to the Institute for help in their difficulties.

The Industrial Commission remarked that the glass industry is a closed trade and its secrets are carefully guarded. That is exactly the reason why the knowledge picked up by Indian students abroad should be perfected by research in the laboratory of the Institute. And it may not be impossible that these researches will result in the discovery of new and improved methods of manufacture, which will create for Bengal glass a reputation which will be the envy of other glass manufacturing countries, and create for it a ready market not only in the other Provinces of India but also in other countries. Science must be harnessed to the chariot of the industry and researches should be continued by competent

men to introduce improvements in the industry and discover new methods of production and new types of the produce.*

The Coir Industry

The coir industry can be converted into a big industry. In Madrás, a good portion of the locally made yarn is exported to European countries, and the rest is converted into ropes, rugs and mattings. Ropes are spun by a simple machine worked by hand, while rugs and mattings of different textures and designs are generally woven on handloom. But factories have been opened in Cochin and Alleppey where power machinery is employed for spinning ropes and shearing rugs. The mattings are generally of the uniform breadth of one yard, and it is stated that one or two of these factories are turning out on an average 25,000 rugs and 50,000 yards of mattings. On the whole, this industry is now well to the front and requires only to be developed on lines best suited to modern requirements. We have it on the authority of the Travancore Exhibition Officer in London that coir mats in the Travancore Court were quickly sold out.

The industry once established in Bengal will surely prosper, as the supply of the raw material is plentiful and the demand for the finished articles on the increase. When the experiment with the cottage industry becomes successful, in course of three years, then would be time to establish one or two big factories in some of the cocoanut centres or in Calcutta.*

Prospects of Caustic Soda Manufacture in Bengal†

A very important step that will give an impetus to industrial regeneration in India, and particularly in Bengal, is the establishment of a number of "key" industries, the successful operation of which alone can make possible the establishment of a number of auxiliary industries, the products of which are so much in

* A complete plan and estimates for an economic Unit manufacturing glass or coir can be obtained from the Industries Department, Government of Bengal.

† The writer is indebted to Mr. K. D. Guha, Industrial Surveyor, Department of Industries, Bengal, for valuable help in preparing this section.

demand that at least some of them constitute, what we call our daily necessities or requirements. The first link in a chain designed to meet the conditions stated above is the *Iron and the Steel industry*. The next link will undoubtedly be represented by the introduction of the *heavy chemical industry*, i.e., acids that great group of alkalis, constituting soda, caustic, bleaching powder, water-glass and a host of compounds essentially needed for the efficient operation of such industries as, textiles, glass making, soap making, pulp and paper making etc. Extensive use is made of such alkaline groups in the manufacture of many an important industry which Bengal has successfully established or can easily establish.

The chemical industry in India is still in its infancy and yet there are many flourishing manufacturing concerns in India which have to depend entirely on imported caustic soda, bleaching powder, etc. If by chance the import of such products, on which the edifices of a number of industrial projects have been built up, is stopped or the price is enhanced, the prospects of the industries now flourishing, e.g., textiles, soap, paper, etc., will be immediately reduced to a state of serious jeopardy. Although many acid making factories have been established in recent times, yet it does not appear that any serious attempt has been made to establish factories for making caustic soda and bleaching powder. The attention of the industrial public, as well as that of the Government, is drawn to the supreme necessity of establishing such a factory to reinforce the shaky foundation of some of the industries already established, if not for anything else. The prospects of establishing a Caustic Soda factory will appear from the tables on pages 472 and 473.

From the table it appears that even during the present depression when every import has diminished in value, that of Caustic Soda has increased, testifying to the enormous increase in consumption of it in Bengal. A significant fact is that the imports of Caustic Soda from England has doubled and that from America trebled during the last six years,—while that from Russia has increased ten times during the last three

IMPORT OF CAUSTIC SODA

1927-28 to 1932-33.

Amount in Cwts.

	1927-28	1928-29	1929-30	1930-31	1931-32	1932-33
U. K. and Other British possession ...	161,100	153,865	169,472	182,155	212,104	230,351
Russia (North) ...	...	...	...	1,591	4,677	5,399
Russia (South) ...	...	...	...	...	776	10,174
Russia (Pacific ports in Asia) ...	...	...	...	149	...	...
Germany ...	1,753	3,874	7,015	21,493	23,846	623
Netherlands ...	1,577	...	1	361	92	...
Belgium ...	1,716	679	14	360	1,654	...
France ...	420	...	20	...	1,116	101
Egypt ...	...	...	...	296	376	1,757
U. S. A. ...	8,731	15,224	13,087	25,466	16,786	31,804
Other Foreign countries ...	...	1	...	30	1	20
	<u>175,297</u>	<u>173,643</u>	<u>189,609</u>	<u>231,901</u>	<u>261,428</u>	<u>280,229</u>

(Blank space indicates that the corresponding figures are not available).

IMPORT OF CAUSTIC SODA

1927-28 to 1932-33.

Value in Rs.

	1927-28	1928-29	1929-30	1930-31	1931-32	1932-33
U. K. and Other Possession	1,809,691	1,729,135	1,882,457	2,110,973	2,555,351	2,709,800
Russia (North) .. ..	....	....	....	16,961	51,293	69,549
" (South) .. ..	....	....	....	....	9,220	132,055
" (Pacific ports in Asia) .. ..	....	....	....	1,790	....	....
Germany	19,781	49,899	101,343	282,499	325,171	9,805
Netherlands	18,114	...	49	79,750	1,182	....
Belgium	18,124	8,967	224	4,852	18,147	....
France	4,796	....	1,062	....	10,913	1,000
Egypt ... ..	....	....	....	3,549	3,608	18,787
U. S. A.	92,272	160,561	140,655	300,632	195,041	401,092
Other Foreign countries	6	7	....	360	11	303
	<u>1,962,784</u>	<u>1,948,569</u>	<u>2,125,790</u>	<u>2,729,595</u>	<u>3,169,937</u>	<u>3,362,057</u>

(Blank space indicates that the corresponding figures are not available).

years in comparison to the pre-depression figures, and only that from Germany has fallen.

The import of bleaching powder during 1927-28 to 1932-33, is given in the tables on pages 475 and 476.

It is significant that although the import of bleaching powder dropped appreciably in 1928-29 it is gradually increasing now.

The modern standardised process for the manufacture of Caustic Soda is by the "Electrolytic method." Raw materials necessary for the production of Caustic Soda by the electrolytic method are: Salt, lime and coal. Salt available in the Calcutta market is quite suitable for Caustic Soda manufacture. The manufacture of Caustic Soda will be further facilitated by the fact that salt purchased for *industrial purposes* can be obtained free of duty. Coal, the next ingredient, is cheaper in Bengal than anywhere else in India. Electric power, which is available in Calcutta, can be had at a cheap rate.

The following table shows the import of Caustic Soda and bleaching powder through the Ports of Calcutta, Bombay, Madras, Karachi, Rangoon during the year 1932-33:

		Caustic Soda (in cwts.)	Bleaching Powder (in cwts.)
Calcutta	...	74,446	57,116
Bombay	...	68,401	74,145
Madras	...	58,462	7,435
Karachi	...	60,808	4,348
Rangoon	...	20,412	568

The following is an estimate of a 3-ton capacity caustic soda and 7.5-ton capacity bleaching powder manufacturing plants together with the daily approximate cost of production:

	Rs.
1. Cost of machinery	...
(a) D. C. Power Plant	... 3,33,000
(b) Cells with accessories	... 80,000
(c) Evaporating Plant	... 1,08,000
(d) Lime Slaking Plant	... 40,000
(e) Beach making	... 15,000
(f) Melting Plant	... 65,000
(g) Boiler Plant	... 5,000
(h) Filter Press, pumps	... 5,000
(i) Transport elevators, etc.	... 10,000
2. Building and erection cost of machinery	... 1,00,000
3. Working capital	... 1,00,000
	<u>Rs. 8,66,000/-</u>

IMPORT OF BLEACHING POWDER

1927-28 to 1932-33.

Amount in Cwts.

		BIG INDUSTRIES				
		1927-28	1928-29	1929-30	1930-31	1931-32
U. K.	...	74,022	76,233	82,477	82,758	82,771
Germany	...	20,909	11,871	16,264	25,251	35,004
Netherland	...	...	...	...	...	197
Belgium	...	33	...	99	2,257	2,613
France	...	4,443	2,849	469	2,299	4,663
Italy	...	873	36	...	5,950	3,594
Austria	...	160	...	...	...	...
China	...	...	...	...	400	81
Other foreign countries	...	...	41	...	90	...
		100,440	91,030	99,309	119,005	128,923
						143,612

(Blank space indicates that the corresponding figures are not available).

IMPORT OF BLEACHING POWDER .

1927-28 to 1932-33.

Value in Rs.

	1927-28	1928-29	1929-30	1930-31	1931-32	1932-33
U. K.
Germany
Netherland
Belgium
France
Italy
Austria
China
Other foreign countries
	884,861	579,289	705,287	893,638	974,872	925,531

(Blank space indicates that the corresponding figures are not available).

It, therefore, follows that Rs. 4,33,000 will be required on Block account and Rs. 1,00,000 will be required as working capital.

Production cost of a three ton capacity caustic soda plant and 7½ ton capacity bleaching power plant per day of 24 hours :

	Rs.
1. Power	196
4170 KWH per ton caustic soda per day .	
12500 KWH per day (for 3 tons of NaOH)	
@ 1 pice per KWH	
2. Salt	86
1.9 tons per ton caustic	
5.7 tons per day	
@ Rs. 15 per ton (duty free)	
3. Lime	105
1.75 tons per ton caustic ,	
0.7 ton per ton bleach 5.25 tons per day	
@ Rs. 20 per ton	
4. Coal	42
2 tons per ton caustic	
@ Rs. 7 per ton	
5. Labour	33
14 unskilled labour per shift of 8 hours	
@ Rs. 15 per month	
6 skilled labour per shift	
@ Rs. 20 per month	
6. Overhead charges	50
1 Foreman per shift	
@ Rs. 40 per month.	
1 Electrician per shift	
@ Rs. 40 per month.	

			Rs.
1	Mechanic per shift		
	@ Rs. 40 per month.		
1	Chemist per shift		
	@ Rs. 150 per month.		
1	Laboratory boy per shift		
	@ Rs. 10 per month.		
1	Engineer @ Rs. 150 per month.		
1	Manager @ Rs. 300 per month.		
3	Clerks @ Rs. 40 per month.		
1	Stenographer @ Rs. 30 per month.		
2	Office boys @ Rs. 10 per month.		
2	Watchmen for the whole day @ Rs. 15 per month.		
7.	Renewals and maintenance ...	...	55
	Electrolysers ...	Rs. 20	
	Evaporat. plant ...	„ 10	
	Melting „ ...	„ 5	
	Bleach „ ...	„ 15	
	Pipe lines ...	„ 5	
8.	Packing ...	...	210
	210 drums of 1 cwt. capacity @ Re. 1 per drum.		
9.	Depreciation ...	...	121
	Machinery Rs. 333,000 @ 10%.		
	Buildings Rs. 100,000 @ 3%.		
10.	Interest ...	...	17
	Running capital Rs. 100,000 @ 5%.		
11.	Obsolescence, Insurance, etc. ...	...	6
	Machinery Rs. 333,000 @ 0.5%.		
	Total cost per day of 24 hours ...	...	921
	Yield per year :		
	900 tons of caustic soda per year of 300 days @ Rs. 240 per ton ...	...	216,000
	2,250 tons bleaching powder per year @ Rs. 120 per ton ...	...	270,000
	Total income ...		486,000

	Rs.
Total cost per year of 300 days ...	311,560
Cost of production per year Rs. 276,300	
Selling cost @ 20% ..	35,260

Net income ... 174,440

An important by-product of the Caustic Soda and Bleaching Powder manufacture is Hydrogen. As it enjoys a very limited market now, nothing has been taken into account on the revenue side by sale proceeds of this by-product.

• Leather Industries

Leather, it need be hardly said, is an indispensable article of use and has been used by man from prehistoric times. The art of making leather can be traced to the earliest records and its production and consumption have gone on increasing almost from year to year during centuries. Growth of population has increased its use and accelerated the pace of its production. Substitutes have been sought ; but such substitutes, as have been found, have not been able to replace it in an appreciable degree—these being used only for minor purposes ; and the lost ground has been more than made up by the new purposes to which it is being applied. For instance, though leather containers for liquids have yielded place to glass bottles and jars and parchment has been replaced by paper, extended use of leather has been found in transmission belting and in many mechanical appliances of modern times. For foot-wear leather is still the best material and the foot-wear industry consumes quite 80 per cent. of the leather produced.

No wonder, leather continues to be manufactured in increasing quantities all over the world and the relative importance of this industry will be apparent from the following figures of the world's consumption of the chief raw materials of the big industries during the year 1919 :—

Material		Value in Dollars
Raw Cotton	...	2,698,927,000
Hides and Skins	...	1,773,000,000
Raw Wool	...	1,575,533,000
Crude rubber	...	299,750,000
Crude tin	...	123,037,000

The post-war tendency is for all nations to be self-contained in regard to the commodities they require. Though complete economic independence is impossible in this world and international trade is a necessity, some countries are certainly in a position to develop certain industries more advantageously than others because of the plenty of raw materials required. India is in a specially favoured position with regard to the supply of hides and skins and these account for about 60 per cent. of the cost of leather. The position of India in respect of her live-stocks and production of the principal varieties of hides and skins in comparison with those of a few countries, where the leather industry has been highly developed, is illustrated in the table given on page 481, though the estimate must, of necessity be rough.

India possesses by far the largest number of cattle-heads among the countries compared. Moreover, Germany and Great Britain do not produce any buffalo hides and goat skins while India produces 3,650,000 of the former and 27,000,000 of the latter per annum. Besides the skins of domestic animals India also produces very large quantities of reptile skins, which also are important.

India's resources in hides and skins amazed the world during the War. On the conclusion of the War an enumeration of the war supplies from India was published. It contained the following statement :—

“Though India has been using ever-growing quantities of local leather for the manufacture of army boots and accoutrements, this country (England) has relied very largely on Indian supplies of tanned hides, which have provided leather for nearly two-thirds of the army boots manufactured. The value of these hides received since the outbreak of war has been over £10,000,000. Since 1916 the whole exportable surplus has been purchased for the War Office by the Government of India at controlled prices, which were considerably less than those for similar hides obtainable from other sources. In order to encourage hide tanning which has greatly increased in

	1	2	3	4	5	6	7	8
	Stock of living cattle inclusive of calves No. of heads.	Estimated gross pro- duction of cattle hides per year in pieces.	Stock of living buffalo No. of heads.	Estimated gross pro- duction of buffalo hides per year in pieces.	Stock of living goats, No. of heads.	Estimated production of goat skins per year in pieces.	Stock of living sheep, No. of heads.	Gross produce of sheep skins per year in pieces.
World ...	597,000,000	89,000,000	47,578,000	5,075,000	202,876,000	120,000,000	575,215,000	174,018,000
India ...	159,000,000	20,475,000	33,750,000	3,650,000	53,634,000	27,000,000	41,217,000	11,600,000
U. S. A. ...	68,484,000	12,584,000	Nil.	Nil.	3,300,000	Nil.	42,586,000	15,380,000
Germany ...	16,714,000	2,675,000	Nil.	Nil.	4,509,000	Nil.	6,000,000	2,175,000
Great Britain and Ireland	12,130,000	2,348,000	Nil.	Nil.	261,000	Nil.	24,283,000	9,097,000

volume, the Munitions Board have prohibited the tanning of skins. . . . Since 1917 the exportable surplus of Indian raw hide has been acquired for the British and Italian Governments, the value of purchases amounting to some £2,500,000 sterling."

When we consider the significant fact that the controlled prices paid were considerably less than the ordinary price, together with the value received for tanned and raw hides during the War for India's exportable surplus, we can form some idea of the wealth which can be acquired from hides and skins if they are properly tanned in the country.

The actual figures of exports given below show the remarkable possibilities of the industry. The figures are for exports of tanned hides from India from 1913 to 1918—the greater part of the hides consisting of cow-hides :

Year	Quantity shipped	Value
Pre-war years	Cwts.	Rs.
1913	194,763	1,75,10,805
1914	187,702	1,98,41,370
War years		
1914-15	217,020	2,40,99,740
1915-16	272,002	3,06,23,737
1916-17	322,390	4,47,12,337
1917-18	361,674	4,86,98,822

The figures for the year 1917-18 do not, however, represent adequately the actual outturn, as on the 31st March, 1918 Government held in stock at Madras, awaiting shipment, 12,400 bales, weighing approximately 67,000 cwts., valued approximately at a crore of rupees.

Before the War Germany, Austria, the United States, Italy and Great Britain used to take annually from India about 800,000 cwts. of raw hides valued at about 7 crores of rupees. This hide could easily be tanned in India and the leather exported.

India possesses almost all the tanning materials required for the manufacture of leather. The materials which are not available locally do not represent more than 5 to 6 per cent. of the total cost of the production of leather and can be imported. As India has a special class or caste employed in the work labour difficulty is eliminated.

Unfortunately the attention of men with money and education was never attracted to this industry which was left to impecunious and ignorant people, with the result that hides and skins were exported to foreign countries to be sold back to India in large quantities as leather.

With these preliminary remarks about hides and skins generally we come to the question of the development of the leather industries in Bengal. The industries may be enumerated thus :

- (1) Hides and skins trade
- (2) Trade in materials and stores required in leather industries
- (3) Tanning industry
- (4) Taxidermy and fur dressing
- (5) The shoe industry
- (6) The leather goods industry
- (7) Manufacture of tanning, shoe and leather goods machinery and appliances.

With the exception of the seventh all other branches of the industry exist in Bengal but are practised in a more or less crude and primitive way and leave considerable room for improvement. We will take the items one by one.

I. Hides and skins trade

Bengal produces cow hides (including calf skins) and goat skins to a large and buffalo hides and sheep skins to a small extent. These hides and skins possess some special characteristics for which they are in requisition. But a large proportion of them contains various defects which restrict their utility. In the programme for the improvement of the hides and skins

trade the first step should be to eliminate these defects which are due to causes which can be remedied. The defects are :

- (a) Poor substance, due to a low standard of cattle-breeding, which can be remedied by better feeding of the cattle,
- (b) Pox marks, which can be avoided by paying more attention to the cattle and timely inoculation,
- (c) Tick marks caused by "cattle ticks," which can be avoided by keeping the body of the cattle clean by occasional bathing and scouring,
- (d) Brand marks, due to the cruel practice of branding cattle with identification marks, which ought to be penalised by legislation,
- (e) Goad marks, which owe their existence to plough and draught cattle as well as those yoked to carts being goaded with sticks with sharp-pointed metal ends. The use of these sticks should be penalised,
- (f) Sore marks and thorn marks, which can be avoided by taking more care of the animals and providing sufficient pasture ground to avoid the cattle straying into jungles and getting scratches from thorny shrubs,
- (g) Vulture scratches, which can be avoided if the dead animal is taken care of and the hide flayed before vultures get access to the carcase,
- (h) Warble holes are common in goat skins. The warble pest has been wholly eradicated in Denmark and the measures taken there ought to be adopted in Bengal,
- (i) Bad flaying producing (1) cuts, (2) deep scores on the flesh side by the butcher's knife, (3) intentional retaining of flesh and trimmings to increase weight,
- (j) Damage due to putrefaction, which can be prevented by timely curing.

The economic loss to the Province due to these defects is enormous, as they reduce the value of the hide by 50 per cent.

Bengal produces goat skins of a high quality which are eagerly bought by foreign countries for the manufacture of glace kid, a high class shoe upper leather. Goat skins worth about $2\frac{1}{2}$ crores of rupees are exported annually from the Calcutta Port. These skins, like the hides, contain several defects, the elimination of which would increase their value. The remedy rests with the herdsmen and curers, whose attention should be drawn to the loss they sustain because of the defects, by systematic propaganda and demonstrations of efficient methods of flaying and curing.

Defects of curing and preservation

Hides and skins are cured for preservation in Bengal in three different ways, (a) by drying in the sun, (b) by salting with *khari* salt and then drying, (c) by applying common or *khari* salt on the flesh side and keeping the hides or skins in wet condition. The defects in preservation by drying are (1) sunblisters, (2) burns, (3) over-drying. The defects of dry salting and loading are specially due to the curers intentionally loading the hides by adding an unnecessary quantity of mud and sand to the salt. The defect of hair slip is noticed in wet salted hides and skins.

For the prevention of the various kinds of damages caused by curing, the present methods of curing should be thoroughly overhauled. Better preservatives should be discovered and more efficient methods of curing worked out by systematic research. A standard of cures should be established and hides and skins containing more or less than a certain percentage of curing materials condemned. Loading has already brought the plaster cured hides of Bengal into disrepute with overseas buyers, and unless a cleaner method of preservation is adopted there is the risk of our losing the important foreign market.

Goat skins are also preserved by wet salting with *khari* salt and by drying. In these processes of curing negligence on the part of curers often cause considerable damage to the skins. The necessity of taking greater care in curing should be brought home to those who are responsible for collecting goat skins

by educative propaganda while researches should be conducted to work out more efficient methods of curing than obtain at present.

These remarks apply with equal force to the collection and curing of buffalo hides and sheep skins of the Province. In Europe and America and even in Africa (Mombassa) measures have been adopted to improve local hides and skins. Similar measures should be taken in Bengal. Bad hides and skins produce bad leather and arrest the progress of the leather industries. The improvement of hides and skins, therefore, is the first step towards the development of tanning and other branches of the leather industries along modern lines.

II. *Trade in materials and stores required in leather industries*

The materials and stores may be grouped under the following heads:—

- (a) Vegetable tanning materials
- (b) Chemicals
- (c) Dyes
- (d) Oils, fats and waxes
- (e) Sundries.

Vegetable tanning materials

The vegetable tan-stuffs used in the tanning industry in Bengal are principally babul bark, goran bark and myrobalans and to a less extent avaram bark, sonali bark, wattle bark, etc. Tanning extracts have also been recently introduced.

The babul bark (*Acacia Arabica*) is an important tanning material containing 14 to 16 per cent. tannin and producing leather of good colour and weight. The trees being scattered over a wide area and transport being expensive the available supply in parts of Bengal at a distance from Calcutta generally remains unexploited. This waste should be avoided and the necessity of Bengal importing it from the Punjab, Sindh and Rajputana removed.

The goran bark (*Ceriops Roxburglemia*) is one of the strongest tanning materials known in the world's tanning trade

and being available in abundance in the Sunderbans should form a very valuable asset of the Province. At present it is treated as a by-product by dealers in the goran logs who bring the logs to Calcutta and strip them of the bark after they have become weather-beaten and part of the valuable tannin has been washed off. As a matter of fact, the bark collected with proper care has been found to contain 36 per cent of tannin in place of 27 which is obtained from the bark sold to the trade by the dealers in logs. Successful attempts have been made by the Bengal Tanning Institute to eliminate some of the objectionable features of goran tannage. And goran bark can now easily command a ready market not only in the other Provinces of India but also in other countries.

Myrobalans (*Tenninalia chebula*) are available in Bengal but its quality being inferior can be used only in sole leather tannage and for the tannage of cow hides and calf skins which are sold in India, rather than for the tannage of E. I. tanned kips, calf skins and sheep and goat skins for export as half-tanned leather. But better myrobalan can be easily imported from the Central Provinces, and specially Madras, where some varieties contain more than 50 per cent. of tannin and also produce excellent colour on the leather.

Sonali bark (*Cassia fistula*) contains from 13 to 14 per cent. tannin and, in conjunction with myrobalans and tarwar bark, produces a light coloured tannage. The available supply should be organised.

Avaram bark is invaluable for the production of half-tanned leather, but is not available in Bengal. It has to be imported from Madras, Bombay and Rajputana. Wattle bark from South Africa and Sumac from Sicily have likewise to be imported for the industry in Bengal.

The modern tendency in Europe and America is to use tanning extracts, and some of the modern tanning establishments in Bengal now import such extracts as they require, with the exception of myrobalan extract which is produced locally. If Bengal is to develop her tanning industry along modern lines she must have tanning extracts and it is desirable that she should

get them locally. At present there are only two factories, one in Ranigunj and the other at Kharagpur which manufacture myrobalan extract. Factories for extracts should be established in Bengal.

Chemicals

The principal chemicals required in the leather industries are lime, sodium sulphide, arsenic sulphide, boric acid, lactic acid, acetic acid, butyric acid, sulphuric acid, hydrochloric acid, salt, bichromate of soda or potash, sugar, borax, sodium carbonate, ammonia, potassium titanium oxalate or other titanium salts, french chalk, etc. Of these lime, sulphuric acid, hydrochloric acid and ammonia are produced locally. The rest are imported. The most important material is bichromate of soda or potash and it can be produced in Bengal as the raw materials required for its manufacture are available. The Industrial Chemist has proved that its production is possible in Bengal, and enterprising Bengalees should take up the work.

Dyes

By far the greatest proportion of colouring matters used in the leather industries in modern times are synthetic dyes, in the preparation of which Germany has specialised. Till synthetic dyes are manufactured in Bengal we must import them from foreign countries.

Fats, Oils and Waxes

The principal fats and oils used in the leather industries are tallow, fish oil, castor oil, linseed oil, neatsfoot oil, and a certain quantity of mineral oil. Cod oil, which is required in currying superior types of leather, in fat-liquoring chrome leather and in chamois leather manufacture, has to be imported from New Foundland as also Draga. But the rest are available in India.

Sundries

Under this head come all those materials and special preparations which cannot strictly be classed under any of the

heads previously treated. There are various special preparations which are used. These are at present imported. But they present a wide field of work for industrial chemists. The value of the annual imports of the special products is not negligible and the major portion of the money spent on them can be earned by local chemists if they direct their attention to manufacture them.

Indian iron and steel factories can manufacture articles such as tacks, pins, eyelets, etc. required in the shoe and leather goods industries. Lasts and knives for cutting the bottom stock can also be manufactured in the Province.

III. The Tanning Industry

The Tanning industry deals with the manufacture of leather. There are several types of leather which are required for various uses. Each type is manufactured differently. It is possible to manufacture the following varieties of leather in Bengal from local raw hides and skins :—

- (1) Sole leather
- (2) Harness and Saddlery leather
- (3) Belting leather
- (4) Leather for suitcases, attaché cases, bags, trunks, etc.
- (5) Tanned East India Kips (so-called half-tanned leather)
- (6) Light leathers
- (7) Foot-ball leather
- (8) Shoe upper leather, box and willow sides
- (9) Glace kid
- (10) Glazed sheep skins
- (11) Picking band and lace leather
- (12) Chrome soles
- (13) Tanned reptile skins
- (14) Chamois leather
- (15) Patent and Enamelled leather

These are manufactured by one or other of the following four principal tanning processes :—

- (1) Vegetable Tanning

- (2) Chrome Tanning
- (3) Oil Tanning
- (4) Alum Tanning

Though some of these varieties of leather are now manufactured in Bengal in most cases the methods used are primitive and crude, and, consequently, the products are not of the high standard which obtains in the West. Improved methods of manufacture, therefore, are essentially necessary. What can be done at once is stated below :

(A) *Leather produced by the Vegetable Tanning process*

(1) Sole leather. This is manufactured in India from buffalo hides, and the bulk of it is as yet produced by the indigenous process of bark tanning. The type of leather which goes by the name of sole leather is not only used for making shoes but is also required for other purposes in mills, factories, railways, etc., for straps, washers, pump buckets, etc. The Bengal Tanning Institute, under the able direction of Mr. B. M. Das, has introduced Western methods of tanning as a result of which a better type of sole leather is now being manufactured in Calcutta. These methods should be extensively adopted.

(2) Harness and saddlery leather. This is also manufactured from buffalo hides by vegetable tanning. This leather is used for making harness, saddle, waist belts and other pliable straps. The manufacture of this leather is recommended to the trade in Bengal.

(3) Belting leather. Manufactured from buffalo hide, this leather, like sole and harness and saddlery leather, is classified in the trade as heavy leather. We still import leather beltings worth about Rs. 10,00,000 a year. The work of producing belting leather in Bengal should be taken up.

(4) Suitcase leather. These are produced from cow-hides. No tanning establishment in Calcutta manufactures superior quality suitcase leather and heavy leather tanneries can take it up as a side line with advantage.

(5) Light leathers. Under this head come leathers produced from calf, goat and sheep skins. Various fancy articles

of leather are made of these leathers, which include morocco, suède, velvet, skivers, book-binding and hat leather. Rollen skins, used in textile mills, also fall under this class. If properly manufactured these leathers can be sold not only in India but also in foreign countries from which enquiries are often received.

(6) Foot-ball leather. The requirements for this leather are but partially met from leather manufactured in India—Calcutta and the Punjab—and partially from imported leather. The whole of our requirements should be met from our tanneries. Both fame and fortune await the Indian tanner who will succeed in tanning out a suitable type of chrome tanned foot-ball leather.

(7) Half-tanned leather. The value of half-tanned leather exported from India is about 8 crores of rupees. The share of Bengal in this trade is insignificant. There is no reason why a portion of the hides and skins available in Bengal should not be exported as half-tanned.

(B) Leather produced by Chrome Tanning

(1) Box and Willow sides. The cow hides of Bengal are eminently suitable for manufacturing these leathers used as shoe upper leather. The following latest available statistics, i.e. those for January and February, 1934, illustrate the demand for box side and other hide upper leather in the United Kingdom :

From		Sq. ft.	Value (
		(000))
Germany	...	246	8,100
Belgium	...	280	8,500
Holland	...	151	5,300
U. S. A.	...	69	3,000
British India	...	721	17,400
Australia	...	96	3,500
Other Countries	...	172	5,200

At present only 5 or 6 tanneries in India are exporting this leather, of which only one is in Bengal. What a vast field

remains to be covered by Bengal ! But small out-turns will not do, because such grading as are required by the Western markets is not possible without large production which only large tanneries equipped with up-to-date machinery and plant for the purpose can produce. A bold bid should be made to capture the markets of the Empire at this opportune moment when the Ottawa Agreement is in force.

(2) Box and Willow calf. The manufacture of box and willow calf can be undertaken by tanneries which turn out box and willow sides as the same machinery and plant would be suitable.

(3) Glace kid. This leather is manufactured from goat skins, and goat skins of Bengal are considered to be specially suitable for the production of high class glace kid. It is produced by chrome tanning and experiments made at the Bengal Tanning Institute have proved that it is possible to manufacture this leather of a fairly good quality in Bengal. Small quantities are being manufactured locally, but expansion is necessary and this expansion should be undertaken with an eye to the export trade.

(4) Glazed sheep skins. Produced by chrome tanning, these are used as a cheap substitute for the more expensive glace kid. There is room for more production of these skins in Bengal.

(5) Picking band and lace leather. Required for textile looms, large quantities of these bands are annually imported as the following figures will show—

Year			Value (Rs.)
1926-27	...	...	8,90,230
1927-28	...	...	8,37,194
1928-29	...	...	8,38,340
1929-30	...	...	8,99,469
1930-31	...	...	7,17,926

As sufficiently thick ox hide is not available in Bengal we must use buffalo hide for picking bands. Investigations carried

out at the Bengal Tanning Institute have demonstrated that bands manufactured from buffalo hide, according to the process worked out there, have been tested both in the Alipore Test House and in some of the jute mills and have proved eminently satisfactory. With the increase of textile mills in the Province the demand for picking bands will also increase. Bengal tanneries should undertake the work of manufacturing these bands as also chrome lace leather, which is manufactured in a manner similar to the bands.

(6) Chrome soles. There is a large demand for these soles in the Central Provinces, Bombay and Madras. Its manufacture in Bengal is, therefore, recommended.

(7) Tanned reptile skins. Skins of crocodiles, lizards, snakes, etc. are available in Bengal and these are in great demand in foreign countries. But by far the largest quantities of these skins are exported raw. They should be exported tanned.

(8) Chamois leather. This is produced from sheep skin in other countries, but in this country good chamois leather has been produced from goat skin. The industry may be expanded.

(9) Patent leather. Crude patent leather is manufactured in Calcutta by *Chamars* and is called "varnished" leather. But patent leather of superior quality is not manufactured, though it is not difficult to manufacture it in Bengal.

(10) Enamelled hides. These are used for upholstering and are now imported. But with a little experience it can be manufactured in Bengal where large quantities are used.

IV. *Taxidermy and Fur Dressing*

Taxidermy is the art of preparing and stuffing the skins of animals. It is of interest to *shikaris* and students of zoology. This branch of the leather industry requires skill and craftsmanship more than capital. And it is possible for quite a large number of well-trained taxidermists to earn a good living from this trade.

There is not much scope for fur dressing, i.e., curing and preparing of the skin of fur bearing animals for wearing apparel.

V. *The Shoe Industry*

The use of shoes, though not universal in Bengal, is extensive and is on the increase. In 1931-32 India imported 9,490 pairs of boots and shoes valued at Rs. 64,93,000 and in 1932-33, 7,882 pairs valued at Rs. 51,77,000. There certainly is a prospect for machine made shoes of the types imported. Shoe making should be established in Bengal as a factory industry as had been done at Agra and Cawnpore in the United Provinces. All over the world shoes are made by up-to-date machinery in large factories and the Bata factory has opened a branch in Bengal. There can be no reason why Bengal should not start factories for producing boots and shoes like those we import. The police and military also require boots and shoes in large quantities and these are now generally imported from Cawnpore. We have every reason to believe that if factories are started by Bengalees in Bengal they will be favoured with the patronage of the Government of Bengal and of the Railways and the Military Departments also.

VI. *Leather goods Industry*

This deals with the manufacture of leather trunks, suit-cases, attaché cases, etc. The demand for these is steadily increasing and the time has come when the possibilities of the establishment of factories with up-to-date machinery should be explored.

VII. *Manufacture of tanning, shoe and leather goods machinery and appliances*

Even in Europe and America the manufacture of tanning and shoe making machinery is a highly specialised branch of mechanical engineering. It will take several years for Bengal to attain such development in its leather industries as to make it economically profitable to start the manufacture of these specialised machines in Bengal. The programme of manufacturing these machinery locally should, therefore, be deferred

till the leather industries have developed to such an extent as would justify our starting to manufacture them. A good many tools and appliances required in the tanning and shoe making industries are now-a-days made in Calcutta and the supply would surely expand with the growth in the demand.

Paper Making

Paper is one of the most important commodities manufactured. It is hard to conceive of civilisation without paper. When we stop to realise the many uses to which paper is put, the many different ways in which we come in contact with it during our everyday life, it is hard to see just how we could do without it. Yet there are but few who have a concrete conception of the enormity of the paper industry. The varieties of paper that are commonly used, everything from the thick manilla wrapping paper for wrapping heavy bundles to the thin transparent cellophane paper that is used to wrap candy boxes and which looks like a very thin celluloid rather than paper, are extremely large.

The paper industry existed in Bengal and India long before the advent of the English, and the number of men employed in it were considerable, as is shown by the fact that in almost all the principal centres of manufacture arose separate villages or parts of towns called after the material. In Bengal the industry was flourishing in Serampore and, as the late Rai Baikuntha Nath Sen Bahadur pointed out, in Murshidabad also. But it is almost non-existent now. Where it survives the methods employed are practically unchanged. Formerly made mainly of old rags, hemp and jute waste, the present day article consists largely of waste paper, repulped and strengthened by an admixture of fresh fibre. The manufacture of this country paper at one time constituted a leading jail industry and is carried on without the aid of any machinery of modern invention. At present, in India, it has little or no commercial future as Mr. Kirk in his *Monograph on Paper Making in the Bombay Presidency* observed. "It is practically habit alone which has prevented the industry from dying out utterly".

The commercial future of Indian paper lies with the machine. As far back as 1716 a paper mill on European lines was opened at the Danish Settlement of Tranquebar in Madras, mainly for the purpose of supplying paper to the printing press opened by the Mission at that place. Next, in 1811 or thereabouts, another mill on European lines* was established at Serampore in Bengal also in connection with Missionary effort. It is not until 1870 that we have record of a mill for the production of machine-made paper. In that year, the Bally Paper Mills started with one machine. • The Company was floated in England, and for a considerable period it proved very successful. In 1879 the Upper India Cooper Mills at Lucknow was established and in 1882 the Titaghar Paper Mills were floated as an Indian Company. Next came the Deccan Paper Mills at Poona in 1883. In 1890 the Bengal Paper Mills started at Rani-gunge. There are several other paper mills in India.

•As Mr. Cogswell said about fifteen years back, "Despite the fact that for a number of years past Government had been conducting investigations as to the utilisation of new fibres and specially bamboo and wood pulp, no really practical advance in the commercial exploitation of India's great natural resources had been made. Concessions were applied for and sometimes granted; schemes for the pulping of bamboo, baib, spruce, bagassee, hemp stalks, and at least eighteen varieties of savannah grasses were examined and debated, but the only visible results that came to my notice in fourteen years was a small book printed on paper made from bamboo, embodying the results of Sindall's *Enquiry into Bamboo in Burma*, a few sheets of paper representing the results of trial with the bamboo in the Titaghar Mills and the laboratory samples produced as the outcome of Mr. Raitt's work at the Allahabad Exhibition and at Dehra Dun."

Experiments have been in progress since then and to-day it is possible to develop the paper industry in Bengal where it already exists and provides more than 83 per cent. of the paper manufactured in India. The following table shows the

quality of the import of paper through the Calcutta Port during the last five years for which figures are available :

		In Cwts.	Rs.
		Packing paper	
1928-29	...	72,416	12,74,105
1929-30	...	92,941	16,86,538
1930-31	...	76,707	12,44,140
1931-32	...	65,699	10,56,963
1932-33	...	95,382	14,58,072

			Rs.
		Printing Paper	
1928-29	...	54,557	7,04,461
1929-30	...	115,574	16,88,030
1930-31	...	118,054	15,56,211
1931-32	...	108,747	12,96,922
1932-33	...	120,253	12,93,258

			Rs.
		Printing paper other than news printing	
1928-29	...	171,126	28,07,907
1929-30	...	131,117	23,56,684
1930-31	...	94,141	16,56,521
1931-32	...	77,278	12,10,070
1932-33	...	68,851	10,48,300

We consider it superfluous to give figures for the other kinds of paper which have been imported through the Calcutta Port.

The value of paper imported through the Calcutta Port in 1932-33 was about Rs. 69,04,113 and that of paper imported into India about Rs. 2,49,30,412.

In Bengal four pulp and paper mills are working. We give below statistics of the production (in tons) of these mills for the seven years 1924-25 to 1930-31 :

1924-25	...	...	24,450
1925-26	...	...	24,807
1926-27	...	...	27,995
1927-28	...	...	30,763
1928-29	...	...	34,045
1929-30	...	...	33,889
1930-31	...	...	34,666

Raw materials ordinarily required for the manufacture of papers are wood, bamboo, grass, hemp, rags, etc. Wood pulp.

is now extensively used. But the availability of wood for pulp is limited. A writer of an article on the subject gives the following about the geographical distribution of the world's forests :

				Per cent.
Asia ...	...	...	...	28
South America ...	...	...	...	28
North America ...	...	...	...	20
Europe ...	...	...	...	10
Africa ...	...	...	...	10
Other areas ...	...	...	...	4

Only soft wood is suitable for the manufacture of pulp and its distribution may be given as follows :—

				Per cent.
North America ...	...	...	...	40
Asia ...	...	...	...	33
Europe ...	...	...	...	21
South America ...	...	...	...	4

In America the drain upon the country's forests is not less than four times as much as the annual growth. Strict forest control and effective regeneration schemes may be enforced in the pulp producing countries. But in spite of such efforts the supply is sure to run short as it takes the normal coniferous trees approximately sixty years to arrive at a suitable age for the manufacture of pulp. The demand for paper will increase enormously during this period.

India alone can offer a satisfactory solution of this difficult problem. India possesses some of the biggest bamboo forests and the bamboo is now being utilised successfully for paper making purposes. Below is reproduced the remarks of the Indian Tariff Board which considered the question of granting protection to the pulp and paper industries :

"There is . . . the testimony of the Forest Research Institute as to the quality of the bamboo paper. The Institute reports that during the last six years the possibilities of manufacturing various kinds of paper from bamboo have been fully tested both on semi-commercial and commercial scale,"

and "bamboo has been accepted by the trade as an excellent material for the production of a wide range of papers."

The Manager of the Government Press was of opinion that the bamboo paper used for printing the *Annual Report of the Forest Research Work in India* was in every way satisfactory and gave no trouble whatsoever. The Institute further had samples of bamboo pulp examined by experts in Germany who, after carrying out tests, reported that bleached bamboo pulp was excellent in quality and would be regarded as a perfect substitute for bleached sulphite cellulose, and the bamboo pulp is at least equally good to sulphite cellulose in dyeing and paper making.

The question of utilising the bamboo for the manufacture of paper had been engaging the attention of experts for some time. In the opening sentence of Routledge's pamphlet *Bamboo as a Paper-Making Material* (1875), the author wrote: "Of all the fibre yielding plants known to botanical science, there is not one so well calculated to meet the pressing requirements of the paper trade as bamboo, both as regards facility and economy of production, as well as the quality of the 'paper-stock' which can be manufactured therefrom. Grown under favourable conditions of climate and soil, there is no plant which will give so heavy a crop of available fibre to the acre, no plant which requires so little care for its cultivation and continuous production." Mr. Routledge visited India and spared no pains to test his theories and expectations. Unfortunately he died shortly after having learned that there were practical as well as physical and chemical difficulties that seriously opposed the growth of a trade in this new paper material. The difficulties have since been overcome. In 1905 Mr. M. Hill expressed the opinion that the manufacture of paper pulp from bamboo would be practicable from the commercial point of view. In Burma the raw material to make one ton of pulp would cost for bamboo £ 1-10 while the amount of spruce wood required in America would cost £ 2-14. The extraction of bamboos from the forest would result in another advantage. The bamboo is gregarious and establishes itself so

which is well above the present need of India except news-printing and old newspapers.

In addition to those already mentioned we have the bamboo forests of Assam and the Chittagong division. These two areas and the Angul area can be successfully exploited for manufacturing paper in Bengal.

Grass is another important raw material for paper making. Some mills in Bengal are already using grass in admixture with imported pulp. The total available supply of the *sabai* grass in the Punjab, Bihar and Orissa and the United Provinces, as estimated by the Forest Department is 50,000 tons a year.

Bengal can easily utilise grass from Nepal, Bihar and Orissa and Assam and grow bamboo to be used as a raw material. The following extract from a note dealing with the question of the possibilities of obtaining paper pulp from elephant grasses by Mr. R. S. Pearson of the Forest Research Institute, Dehra Dun, would give us an idea of the grass resources of Assam :

“An extensive grass area was found to exist in the angle made by the Brahmaputra and Monas rivers, on the east bank of the former opposite Goalpara, . . . in the Barpeta subdivision of the Kamrup division. The grass in this area is estimated to cover some 15,800 acres, while a similar area exists on the south bank of the Brahmaputra below Goalpara.

“The most important species of grass found in these areas are Khagra (*saccharum spontaneum*) and Batta (*saccharum narenga*) with patches of Nal (*phragmites karka*) on the more swampy ground. Sample plots were taken to determine the outturn per acre in order to obtain an approximate estimate of the annual yield. The grass was cut over a given area and weighed over and again when dry, from which it was ascertained that Khagra yielded 7.8, Batta 3.5 and Nal 8.04 tons per acre of dry grass.

“It would not be possible to crop the same areas annually, and Mr. Hole, the Forest Botanist, who has

for years studied these grasses to determine their mode of growth, states that Khagra and Nal can be cropped every other year and Batta every third year. By adopting this rotation we can get in round figures a sustained annual yield of 4 tons of Khagra and Nal and 1 ton of Batta. Khagra is found over a greater extent of the area than the other two species so that were an average to be struck, based on actual areas covered by these three species, this average would probably work out to over 3 tons per acre ; for safety's sake it is assumed that all three species occur in equal quantities, and under such an assumption, we may expect to get a sustained yield of 3 tons per acre per annum or a gross annual yield of 47,400 tons per acre of dry grass, which put at a low yield of 33 per cent. of pulp, gives over 10,000 tons of pulp per annum."

The cost of extracting a ton of air-dried grass to a place just below the junction of the Monas and Brahmaputra rivers for transportation works out as follows :

Khagra	...	...	Rs. 7-8 per ton.
Batta	...	...	„ 6-2 „
Nal	...	...	„ 8-8 „

Samples of the above grasses were sent to England to be tested on a laboratory scale, while several tons were sent to an Indian paper mill to be made into paper. The results were satisfactory and proved that a very fair quality of paper can be produced from these grasses at a relatively low price. Dr. Brown of the Bureau of Forestry, Philippines, has stated in his pamphlet on *Philippine Forest Products as Source of Paper Pulp* in which he deals with Khagra, says that Dr. Richmond found that the pulp from Khagra grass bleached to a good white color with only 2.3 per cent. loss in weight by the use of 5.7 per cent. of bleaching powder calculated on the original weight of the material digested.

In Assam the Monas area was dealt with first by reason of its relative proximity to markets and sources of labour, and it

may not be superfluous to add that there are other very extensive and suitable areas in the Brahmaputra valley as also throughout Burma.

Bengal, thus, is advantageously situated in the matter of the supply of raw materials. Nor is this all. Experiments with jute and jute-stick should be carried on and it is likely that jute will supply a cheap and abundant source of raw material. If the experiments prove successful Bengal would be the most important paper producing centre in the world.

The chemicals required for the manufacture of paper are numerous. The most important articles which cannot be obtained in India are sulphur, starch, bleaching powder, soda and caustic soda. But caustic soda and bleaching powder can be produced in India and the sooner we turn our attention to their production the better.

Bengal has bamboo, grass, coal, salt, lime, etc. within easy reach and thus enjoys special facilities for the development of the paper industry.

The cost of machinery for a bamboo pulp and paper mill of 5 tons capacity per 24 hours, as quoted by a German firm is as follows :

	£.
(1) Mechanical equipment of bamboo cellulose mill	7,350
(2) Mechanical installation of a paper mill	3,750
(3) Mixing chest, strainer, pumps, pipings, etc.	1,065
(4) Rewinder, slitter, cutter, etc. ...	385
(5) Paper machine ...	7,580
(6) Accessories to the Paper machine ...	275

20,405

This does not include recovery plant, caustic and bleaching powder plant, power plant, boiler, etc. These would require Rs. 2,50,000.

Thus, including working capital, a sum of about Rs. 6,50,000 would be required for a properly fitted up mill.

The present consumption of paper in Bengal represents only a small fraction of the demand which must eventually be developed as the result of spread of education. The highest consumption of unmanufactured paper in India took place in 1929-30 amounting approximately to 130,000 tons or less than 1 lb. per head of population per annum. The potential Indian demand may be realised by reference to the following figures of consumption per head in other countries in 1925 :

				lbs.
United States	...	•	...	152
Great Britain	...	•	...	81
Germany	...	...	...	48
France	...	...	...	40
Belgium	...	...	...	50
Argentina	...	...	...	31
Australia	...	...	...	44
Chili	...	•	...	26
Japan	...	...	...	18
Brazil	...	...	...	13
Egypt	...	...	...	5

That Bengal will soon consume at least 50 lbs. of paper per head per annum is certainly a consummation devoutly to be wished. And when that day comes it should not find Bengal unprepared to meet the demand for paper.

From a business point of view also the industry must be regarded as highly paying. This will appear from the two estimates given below :

(1) Estimate for the production of a ton of bamboo pulp (unbleached) near Calcutta :

				Rs.
Bamboo	2¼ tons	per ton pulp	@ Rs. 15 per	
ton	...	...	...	33.75

Chemicals	...	...	...	20
On the basis of	500 lbs. lime @ Rs. 20 per			
80 per cent.	ton.			
recovery	Na_2SO_4 500 lbs. @ Rs. 60			
	per ton.			
Coal 1.5 tons per ton of pulp @ Rs. 7	...			10.5
Labour	...	...	...	15
Overhead charge	...	...	...	2
Repairing	...	...	...	10
Depreciation				
On machineries, plant (capacity 1500 tons				
per year Rs. 4,00,000 @ 10 per cent).	...			26.7
On buildings Rs. 1,00,000 @ $2\frac{1}{2}$ per cent.				1.7
Interest on working capital Rs. 1,50,000 @				
6 per cent.	...	...	...	6
Insurance and Obsolescence	...	...	...	2

(2) Estimate for the production of a ton of bamboo paper near Calcutta.

				Rs.
Basis :				
1 ton of paper (90 per cent. pulp plus 10 per				
cent. filler).				
Pulp	...	...	...	127.65
Bleach 200 lb. bleaching powder @ Rs. 120				
per ton	...	...	...	12
Other chemicals	...	...	...	12
Coal 2.5 tons per ton of paper @ Rs. 7 per ton				17.5
Labour	...	...	...	20
Overhead charge	...	...	...	5
Repairs	...	...	...	10
Packing	...	...	...	20
Depreciation on machineries, capacity 1500 tons				
per year Rs. 1,50,000 @ 10 per cent.	...			15
On buildings Rs. 1,00,000 @ $2\frac{1}{2}$ per cent.				1.7
Interest on working capital Rs. 2,50,000 @				
6 per cent.	...	...	...	10
Insurance and Obsolescence, etc.	...	...	...	5

The difference between the cost of production and the expected price would appear from the average prices of the India made paper per ton for the seven years 1924 to 1930—

					Rs.
1924	...	...	...	...	530.30
1925	...	...	...	...	495.65
1926	...	...	...	...	492.47
1927	...	...	...	...	486.07
1928	...	...	...	...	475.43
1929	...	...	...	...	458.50
1930	...	...	...	...	438.00

It will be noticed from the table that the price of paper has been falling. Even if it touches the low level of Rs. 400 the production of paper would remain remunerative.

Solvay Soda

The importance of the manufacture of chemicals in India has been explained previously. The outturn of chemicals manufactured in the country in 1932-33 is given below:—

Sulphuric Acid	...	25,000 tons.
Hydrochloric Acid	...	500—600 „
Nitric Acid	...	500—600 „
Ammonium Sulphate	...	8,411 „
Phosphoric Acid	...	13.5 „
Zinc Chloride	...	5.5 „
Epsom Salt	...	2,500—3,000 „
Alum Potash	...	800—1,000 „
Copperas	...	800—1,000 „
Copper Sulphate	...	100 „
Glauber Solt	...	1,000 „
Alumina Ferric	...	1,000 „

It is apparent that all attempts in this direction have left the alkali industry untouched. The use of Sodium Alkalies in glass, soap, paper and several other important industries is

demonstrated by the increase in the import figures and demands the attention of Indian industrialists to the development of the industry in India not only to gain profit but also to guard the glass and other industries against the contingency of foreign supplies being minimised or stopped altogether. The following tables show the import figures of all chemicals and those for Sodium Alkalies separately :—

Bengal's share in 1,000 rupees.

	1928-29	1929-30	1930-31	1931-32	1932-33
Total import of chemicals excluding manure and medicine ...	1,00,95	1,17,32	1,03,60	99,50	1,07,57
Per cent. total chemicals imported into India ...	40.5	42.0	39.5	38.5	39.5
Sodium Bi-carbonate .	2,85	2,92	2,52	2,28	2,50
Sodium Carbonate .	34,03	41,15	33,61	35,84	37,21
Sodium Hydroxide .	6,74	6,47	8,87	10,29	8,79
Total Sodium Alkalies	43,62	50,54	45,00	48,41	48,50
Percentage of total chemicals import into Bengal ...	43.5	43.1	43.5	48.5	45.2

Import to India in 1,000 rupees.

	1928-29	1929-30	1930-31	1931-32	1932-33
Total import of chemicals excluding manure and medicine ...	2,47,94	2,78,73	2,61,22	2,56,97	2,71,25
Sodium Bi-carbonate ...	6,49	9,07	7,00	8,02	7,92
Sodium Carbonate ...	62,45	71,08	64,51	61,76	64,76
Sodium Hydroxide ...	19,48	21,25	22,29	31,70	33,92
Total Sodium Alkalies	86,42	1,01,40	93,80	1,01,48	1,06,60
Percentage of total chemicals imported...	34.5	36.3	35.5	39.2	39.5

Practically the only attempt that had been made to manufacture Sodium Alkalies in India was at Kathiawar. The process adopted was the Solvay Ammonia method. But the failure of the undertaking was, most probably, due to the plant being far from up-to-date.

This should serve as a warning to our industrialists. When starting an industry requiring the use of complicated

machinery the order for machinery should be placed with a firm of repute which has specialised in it and which would enter into a contract not only to instal the machinery but also to prove the fulfilment of the specifications and train local workers. One of the many advantages of this arrangement is that the price of machinery is paid after the factory has been run to the satisfaction of the proprietors. It is easier to raise share capital and make other necessary financing arrangements when the production has begun than before.

Had this been done the failure of many undertakings could have been averted and the progress of our industrial undertakings would have been more rapid.

Method of Production

The well established method adopted for the manufacture of Sodium Bicarb. and Carb. is the Solvay Ammonia process and that for Sodium Hydroxide the Electrolytic process which has been described before. The Solvay process consists in passing Carbon Dioxide in Ammonia brine with consequent formation of Sodium Bicarbonate. The solid Sodium Bicarbonate is separated from the "mother liquor" by vacuum filtration and calcined to produce Sodium Carbonate. Carbon Dioxide which evolves during calcination of Sodium Bicarbonate and lime stone and fixed Ammonia distilled are used over and over again, the lime being used for distilling the fixed Ammonia.

The most important point is the maintenance of equilibrium condition co-related with the discharge temperature of the carbonating tower. This condition controls other major processes. It is for every particular locality to find the most economical temperature of the cooling water.

The Solvay method involves highly technical control for various equilibrium conditions and it is difficult to get training in the processes. But theoretical conditions and practical manipulations do not possibly conform so well in any other process.

The only by-product in Solvay Soda is Calcium Chloride

in effluent from Ammonia still. It is mostly thrown away as its uses are limited, whereas electrolytic caustic yields chlorine and hydrogen. Unless chlorine can be utilised the plan falls through. But Bengal's (and India's also) Sodium Hydroxide requirement is more than equivalent to that of bleaching powder and Hydrochloric acid put together. Until this equilibrium is established or some other use for chlorine is found a portion of Sodium Hydroxide will have to be obtained by causticising Sodium Carbonate.

Investment required

Needless to say that the total initial investment must vary according to the system of payment adopted. Instalment payment for machinery is possible to arrange. The following calculation arrived at from quotations from three manufacturers for a 60 ton capacity plant gives the maximum requirement :—

Machinery	...	...	Rs. 12,00,000
Duty, freight, insurance, etc.			
@ 20 per cent on machinery	„		2,40,000
Erection cost @ 20 per cent. on			
machinery	...	...	„ 2,40,000
Cost of land	...	...	„ 1,00,000
Building and quarters	...	„	3,25,000
Working capital (to meet			
cost of production for			
three months)	...	„	3,30,000
Factor of safety @ 5 per cent.	„		1,21,750

Total	...	Rs.	25,56,750

Cost of Production.

The cost of production has been calculated for one ton on the basis of medium efficiency of operation. With maximum

efficiency reached the cost of production will come down by about 5 to 7.5 per cent. ; and it is safe to take the reduction to be 5 per cent. It is itemised below for one ton of Sodium Carbonate in rupees for a 60 ton plant :

	Rs.
Salt 1.6 tons @ Rs. 13-8 per ton	21.6
Lime stone 1.3 tons @ Rs. 7 per ton	9.1
Coal 0.5 tons @ Rs. 7 per ton	3.5
Coke 0.13 ton @ Rs. 12 per ton	1.56
Ammonia Sulphate 30 lbs. @ Rs. 7 per cwt.	1.88
Bags 20 (1 cwt. capacity)	4.25
Power 225 K.W.H. @ As. 6 per K.W.H.	7.05
Labour	5.00
Technical Management	1.50

Depreciation—

10 per cent. on machineries	8.0	
3 per cent. on buildings	0.5	8.50
Repairs		1.00
Insurance		0.25
Sales and Office		1.00
Factor of safety @ 5 per cent.		3.31
Total		69.50



Profit and Loss

The following calculations have been made on the basis of the average price obtaining in the Calcutta market during the last five years and on the assumption of the entire product being calcined to Sodium Carbonate. Marketing of Sodium Bicarbonate for commercial and medical purposes offers larger return than marketing as Carbonate. It has been found that drying of Bicarbonate in the sun produces the finished product containing over 70 per cent. Bicarbonate but for medicinal

purposes further purification and drying under pressure carbon dioxide is necessary.

RECEIPTS	EXPENDITURE
Rs.	Rs.
Proceeds from sale	Cost of production
$360 \times 60 \times 20 \times 5.9 = 25,60,000$	$360 \times 60 \times 69.5 = 14,01,200$
	Management and
	sales expenses 1,28,000
	Net profit ... 10,30,800
Rs. 25,60,000	Rs. 25,60,000

Percentage of profit = 40.

Financial Risk

Every manufacturing enterprise suffers from risks attendant upon unfavourable changes in (1) the supply of raw materials, (2) demand for the commodity, and (3) methods of manufacture.

In the case of the raw materials it is of importance to note that they are more or less available locally. Thus the industry may be made independent of foreign supply in this direction. With a stock for three months' requirement in hand and suitable contracts for regular supply the risk under this head would become almost nil.

Regarding demand suffice it to say that the import figures show that the consumption has been on the increase even during the depression period. As the products are used for articles in every day use the chance of any sharp decline in the demand cannot take place. The local production of the plant, moreover, would not exceed 40 per cent. of the total requirement.

Regarding quality and finish there is little to worry over as the only troublesome impurity is iron, the percentage of which can be successfully controlled.

Evolutionary changes in the method of production will not be difficult to follow and adopt.

Conclusion

The economic working of the project cannot be questioned, and has been further strengthened by the proposed installation of a plant in the Punjab as disclosed by a discussion in the Indian Legislative Assembly on the 14th August, 1934.

The urgency of the manufacture of Solvay Soda in India for her various industries cannot be over-estimated and the industry must be established in the country without further loss of time.

Cutlery

The Cutlery Industry has been discussed in the two previous sections—Cottage and Small Industries of Bengal. Manufacture of Surgical Instruments can be efficiently carried on in Bengal to meet the growing demand of such instruments in the large number of hospitals, Government and private, as also for the use of private medical practitioners. The Department of Industries, Bengal has successfully standardised the manufacture of a large number of surgical instruments particulars of which can be obtained by a reference to the Department. A complete scheme with all necessary details about plant, labour, raw material, working capital etc. can similarly be obtained from the Department mentioned above.

CHAPTER XV

THE PROBLEM OF INDUSTRIAL LABOUR

At the memorable meeting of the Imperial Economic Conference in May, 1932 the Right Hon'ble Stanley Baldwin, leader of the English Delegation, addressing his colleagues of the Indian Delegation said :

"No body of responsible and informed opinion in this country has any desire to impede or retard the industrial progress of India on sound economic lines.

- On the contrary we welcome the growing development of your manufactures and rejoiced when we found your country included by the League of Nations among the eight great industrial nations of the world."

To that the reply made on behalf of India by Sir Atul Chatterjee, Leader of the Indian Delegation, was a fitting one and becoming of the great country he represented—the country to the resources and immense possibilities of which it is the object of the present work to draw the attention of the rising generation of the country and of generations yet unborn :—

"It is a commonplace observation that India is primarily an agricultural country ; our peasants till the land mainly for growing food crops for their own subsistence. But external commerce is no novel feature of Indian life. Even in the days of the Roman Empire Indian exports used to find their way to Europe. . . . The maintenance and improvement of India's export trade in agricultural produce are . . . a matter of primary importance to us. But as you have observed, Sir, India is developing her industries as well. This again is not an entirely new feature in our life, for, in the earlier periods of our history, our staple exports were mainly manufactured commodities. With the progress of industrial

revolution in Europe we in India lost ground in this respect."

It is a significant sign of the times that with the realisation by the Government of India of the necessity of securing diversity of employment for the people through industrial development, the people have awakened themselves to a sense of their responsibility which finds expression in their determination to make the necessary effort to make up the lee-way. Lost ground will have to be recovered, by no means an easy task ; but it is fully hoped that the genius of India and the aptitude of her people will be found equal to the task. India, as Mr. Baldwin pointed out, has been included by the League of Nations among the eight great industrial nations of the world ; indeed she occupies the fifth place in the list. To the industrial importance of India, allusion was made by the India Office in the following terms :

"Twenty-eight million agricultural workers (excluding peasant proprietors) ; 141,000 maritime workers, lascars, etc.—a figure second only to that of the United Kingdom ; over 20 million workers in industries including cottage industries, mines and transport ; railway mileage in excess of every country except the United States."

About 750,000 persons are employed in the Indian plantations (tea, coffee, etc.). And the growth of Indian factories has been satisfactorily, if not surprisingly rapid. In 1922 their number was 5,144, and in 1929, 8,129. During this period the average daily number of employees rose from 1.36 millions to 1.80 millions and Bengal stood first with 589,860 workers, while the Bombay figures did not exceed 366,029.

Big mills and factories are an innovation in the economic life of the country. To-day we hear a good deal about the industrial development of Japan, the country which threatens to swamp our markets with cheap goods. And it would be interesting to know how labour in Japan had to be attracted to the mills and factories when they were first established. The

New York Academy of Political Science published in 1929 Mrs. Dorothy Orchard's *An Analysis of Japan's Cheap Labour* from which we make the following extract :

"The people of Japan are essentially agricultural. They are attached to the land and loath to leave it. They are conservative and they have not taken kindly to the factory. In order to get the country boy or girl to leave the farm, poor as it is, the recruiting agents have need to paint glowing pictures of the high wages that may be earned and the glories of dormitory life, for the recruited labour is housed by the employer. . . . The expense of recruiting one female hand, according to estimates made by the Japan Cotton Spinners' Association, in 1919, ranged from 3 Dollars (i.e. Rs. 9) to 25 Dollars (i.e. Rs. 75) and when indirect expenses were added more than 25 Dollars (Rs. 75) was needed for employing one female."

This reminds one of the work of the *Arkaties* or recruiters of labour for the tea gardens of Assam. The climatic conditions of the tea garden areas were far from healthy and the work was one to which labourers who had to be recruited from the poor people of the other provinces were not accustomed. They had, therefore, to be allured with prospects which were not always existent. Thus recruiting degenerated into a vicious system which, however, thanks to the pressure of public opinion, was abolished, mainly through the efforts of Sir Henry Cotton as Chief Commissioner of Assam and Lord Curzon as Governor-General of India. Work in the gardens is now done with voluntary labour from various provinces.

Yet Japan has worked wonders with labour which, in the beginning, had to be recruited with great difficulty. The Indian mills and factories were fortunate in this respect ; for labour, due to periodical famines and floods and small agricultural holdings per family of *rai-yats* in the village, was not difficult to obtain from the beginning though the treatment that the labourers receive leaves much room for improvement.

We have pointed out that in 1929 the number of industrial workers employed in Bengal was 589,860. Had all the workers been Bengalees, Bengal would not have been in the sad plight she is in to-day. Unfortunately, the major portion of the labour force which finds employment in Bengal, specially in the jute and cotton mills, etc. in and about Calcutta, is imported labour—coming from other provinces. The influx of this labour has been rapidly on the increase.

In the Report of the Indian Industrial Commission pointed attention was drawn to this anomaly :

“The jute mills draw their labour mainly from Bihar and Orissa, the United Provinces, the Northern Districts of Madras and Bengal. The Bengali is taking a smaller and smaller share in the openings for manual labour created by the mills. Some interesting proofs of this tendency are cited in a note placed before us in Calcutta, from which we take the following particulars. In a Government report on labour in Bengal (1906) it is stated that 20 years earlier all the hands in jute mills were Bengalis, but that, at the date of the report two-thirds of them were immigrants. At present about 90 per cent. of the labour is imported. A census was taken in 1902 by the managing agents of four mills in Garulia, Bhadreswar and Titaghur. Another census was taken by the same managing agents in the same areas in 1916, the mills having meantime increased to seven. The result showed 28 per cent. of Bengali workers in 1902 and 10 per cent. only in 1916. The shortage had been supplied from the Northern Circars. It is significant that there were 350,000 more immigrants in 1911 than in 1901 in Calcutta, the 24-Perganas, Howrah and Hooghly. In the 24-Perganas in particular the number of immigrants had increased by 176,000 or nearly 80 per cent.”

The following statement and figures are taken verbatim from the report of a jute mill in Bhadreswar dated September 1929 :

“The local staff employed in the Jute works is about

6,200. Of this number 22 are Europeans, and of the remainder only 12 per cent. are Bengalees, 88 per cent. of the operatives being people from other provinces including 56 per cent. from Bihar and Orissa, 20 per cent. from C. P., 10 per cent. from U. P., and the total number of Moslem operatives was 1,688 or about 27 per cent. of the total staff."

This particular mill paid wages amounting to Rs. 16,46,000 to its workers in 1928. The total amount of remittances by money-order through the mill post-office during 1928 was Rs. 3,88,707.

Jute mills in Bengal employed about 340,000 operatives in 1928-29 and paid approximately 8 crores and 50 lakhs during the year in wages. The share of wages paid to non-Bengalee workers is about 7.65 crores out of which they remitted to their village homes more than 2 crores of rupees.

The seriousness of the provincial economic situation will be brought home by the figures quoted above. What really are the causes why Bengalees are being ousted in their own home by imported labour? In our opinion there are two causes which are more important than the rest :

(1) The prevalence of malaria in the Province. It has assumed alarming proportions. Every year there occur in Bengal from 350,000 to 400,000 deaths from this cause alone. And it is responsible for 200,000,000 days of sickness in the Presidency, every year. Malaria is a preventable disease and as such it has been obliterated in some parts of the world, *e.g.* in the Panama Zone and in the south of Italy, particularly in Genoa, Venice and Naples where it had for years been levying its heavy toll of death upon the people as it is doing in Bengal to-day. It is, therefore, necessary to improve the health of the people of Bengal by eradicating malaria in the rural areas.

(2) The mode of living in the mill areas is far from congenial to the modest Bengalee who loves his village home. The cleanliness even of the poor Bengalee is well-known. He lives with his family in a separate homestead with two or

three thatched huts with mud walls which are kept scrupulously clean. The country is green and pleasant. The women-folk enjoy privacy and the amenities of rural life healthy under all circumstances. Compared to that what are the conditions under which the workers recruited from the villages are compelled to live in the mill areas?

That the *Bustees* in which labourers live present a striking contrast to the conditions prevailing in the village homes even of the poor in Bengal must be admitted. It is hopeful, however, to note that "the Management of the Jute Mills near Calcutta have for some time past realised that in order to secure a stable and contented labour force it is worthwhile devoting time and attention to the question of housing Some of the quarters which were built in the early days of the industry were not very up-to-date with regard to ventilation. The newer dwellings are however built on comparatively modern lines. The arrangements for sanitation and the supply of water for drinking and bathing are as a rule satisfactory."

It is to be hoped that the improvement thus inaugurated will proceed satisfactorily till in all industrial centres housing conditions become such as would attract labour from Bengal villages and create a stable and contented labour force.

Unfortunately it has to be admitted that for various reasons the surroundings in most places are yet unsatisfactory and in some cases deplorable in every respect.

The effect of such surroundings is disastrous. In the Report of the Indian Industrial Commission it was said that :

"Mill-owners complain of the unwillingness of their labourers to respond to the stimulus of higher wages ; the latter do not as a rule increase their output when engaged on piece-work, but merely work for fewer days in the week. The reasons for this were investigated in some detail by us. We have little doubt but that the long hours passed in the uncongenial, if not unhealthy surroundings of a factory, from which the labourer returns at night to a dirty, crowded and insanitary hovel, where his only relaxations are found in the liquor

shop and the bazar, are most unattractive to a man accustomed to rural life, and it is only the congestion existing in his native district and the desire to earn higher wages for a time, that lead him to submit to such conditions. The mill workers of Bombay and Calcutta do not for the most part remain permanently at the mills, but return after a longer or shorter period to their native villages, though they eventually drift back in many cases to the mills. This practice affords a much needed change from the conditions under which the labour force lives and works, conditions which can never create a skilled and steady class of operatives."

The statement demonstrates the difficulties that now beset the path of the development of a class of skilled operatives with steadiness. But unless and until this class is created the industrial development of the country will not only not be progressive but also may even run the risk of being retarded. Apart from the difficulties described above the lack of a regular system of apprenticeship training in mill areas definitely prevents the growth of this class from being promoted. The statement quoted above, moreover, describes conditions reminiscent of the conditions in European industrial areas which social workers have been striving hard to change. These unfortunate conditions have been described by various writers. Conditions in "Darkest England" were depicted by General Booth as conditions which created the Lost, the Abandoned, the Outcast, the Outlaw, the Unmoral and the Disinherited of the world. General Booth described the destroyed and the desecrated home, "the overcrowded home of the poor" which "compel the children to witness everything." Of the industrial areas he said, "Think of the multitudes of children born in our work-houses, children of whom it may be said 'they are conceived in sin and shapen in iniquity' and, as a punishment of the sins of the parents, branded from birth as bastards, worse than fatherless, homeless, and friendless, 'damned into an evil world', in which even those who have all the advantages

of good parentage and a careful training find it hard enough to make their way.”

We purposely refrain from quoting Taine's descriptions of what he calls forms of existence “opposed to and at variance with the natural instincts of man.”

Oliveira Martins, the Portuguese author of *The England of To-day*, described the scenes in the docks with the skill of an artist and the precision of a photographer and said,

“A Dante of our times would place scenes of this kind in the last circle of his Inferno. There hovers in the air an atmosphere of vice, one breathes the acrid fumes of miserable dirtiness, one sees the foul rags and tatters of civilised life. The multitude of pariahs come from every part all classes, mingled in the hunger that makes all alike, amid a dense multitude of drunken vagabonds like repulsive savages, with downcast eyes, scarred flesh, ragged clouts.”

Such had been the conditions of industrial England—conditions which we want to avoid in our industrial progress.

We referred to the jute mills. We quote below what Dr. Broughton (Lady Chatterjee), who had made a special study of labour in Indian industries, has said about the housing arrangement in these mills :

“The mills are situated in a semi-rural area round Calcutta, and unless housing is provided by the mills the workers have to fall back upon the very unsatisfactory accommodation available in the hastily constructed *bazars* or *buslees* round the mills. It is believed that about one-third of the total number of jute mill workers live in quarters provided by the mill management.”

Then again the needs of the women are not sufficiently considered. There are frequently no separate rooms for them to go into when ill or suffering from an accident. The Royal Commission on Indian Labour, generally known as the Whitley Commission, took considerable pains to get at the root of the

causes of the discontent of the Indian factory workers and placed the housing arrangements in a prominent position among them.

The Industrial Revolution in England drew men and women from their villages in large numbers and caused them to live in close proximity to their work in the large industrial centres which grew up. They had to learn how to manipulate machinery. Thus the class known as industrial workers grew up. This divorce of factory workers from the land has had on the health of the factory population and on their mental development an effect which is far from desirable. During the Great War an enquiry was instituted in England and it was found that not only did ill-health compel many women to leave at a comparatively early age but that the incidence of sickness increased with the length of service. The effect of employment in factories on the mental development of the workers is no less serious. Recent research into fatigue has shown that the centre of fatigue is the brain. When the brain is laden with the waste-products of physical activity it cannot be expected to respond to intellectual stimulus with any efficiency.

The excessive over-crowding, which factory workers have to endure, has an even more deleterious effect on family life, which the Bengalee is accustomed to and for which he is ready to suffer sacrifices. In many cases the conditions prevailing in the mill areas prevent a man from bringing his family with him. For a Bengalee family life is most zealously guarded and seclusion and privacy are sought after. Conditions of life in the mill areas have a very disintegrating effect on it, for when a man does bring his family with him he has almost invariably to live crowded up with other families and all hope of privacy disappears. The Bengalee housewife naturally takes a pride in keeping her home scrupulously clean and all her cooking utensils shining with brightness. This is no longer possible when she has to live in a crowded *bustee*. The supply of water is limited, sometimes scanty and impure. All the cooking, with its attendant smoke, soon blackens everything and even the clothes which are hung up to serve the purpose of screens very soon become dirty.

The atmosphere in such circumstances becomes vitiated and diseases naturally thrive in this environment. To rear healthy children what is wanted first is a home, secondly milk, thirdly fresh air, and fourthly the sun; for in India the beneficial influence of the sun should be emphasised. What is to become of the child when the home is a dingy, dirty hovel where milk—though adulterated—is difficult to get, fresh air is banned and from which the rays of the sun are banished?

No wonder, the Bengalee has to yield place to workers from other provinces who are used to a low standard of living.

Even the Bombay mill operative, remarked the Industrial Commission, "is more tolerant of uncomfortable surroundings than the Bengali labourers, who possess a relatively high degree of intelligence."

Dr. Broughton further observes:

"While the industrial revolution is a *fait accompli* in England the process is only gradually taking place in India and agriculture still holds its own. The immediate consequence of this is that while in England a definite industrial class has grown up with recognised rights and obligations, in India such a class is only slowly coming into being. The industrial workers in India form a very small portion of the general population and on the whole do not seek industrial work as a permanent means of livelihood. Further their rights and obligations are also correspondingly slow in receiving recognition."

As we want a definitely industrial class and want also to avoid the tragedy of the conditions which the industrial system of European countries had given rise to, we must be careful, specially in the following matters:

(1) *Housing*. In this matter the example set in Port Sunlight may be profitably adopted. Every worker should be encouraged to bring his family with him. He should get a house for his exclusive use which will consist of two rooms, a verandah and a kitchen with two pieces of land one in front of and the other behind the house. The land in front, *i.e.*, facing the road, should be converted into a small garden which

the company will maintain while the land at the back should be given to the worker to be used as a kitchen garden. The Port Sunlight scheme is to award prizes to those who utilise the kitchen garden most usefully and beautifully. Such arrangement will attract the Bengalee worker from the village and gradually evolve an exclusively industrial class in Bengal to meet the demands of the industries. The question of employing more Bengalees in the industries of Bengal need not rouse inter-provincial jealousy. With charity for all we can say that the moisture in a province ought to give sustenance to its own people first. This principle has been pushed to extremes by some of the Colonies of the British Empire where the gates have been slammed against Indians on the plea of their comparatively lower standard of living, *i.e.*, their less expensive and more frugal mode of living. In a lesser degree it has also found favour with some of the provinces of India. In the city of Bombay the Commissioner of Police, we are told, is not permitted to issue motor-car driving license to any one, not a resident of or domiciled in the city. In Bihar and Orissa no Bengalee, who is not domiciled there, can get entrance into the Itki Hospital for treatment, and admission for Bengalees—other than those domiciled—in the educational institutions is so limited as to be absolutely inadequate for the needs of the Bengalees there. We purposely refrain from giving more instances which can be multiplied. For various reasons which need not be enumerated but among which the fertility of the soil must count high, the standard of living of the Bengalees is higher, *i.e.*, more expensive than that of the inhabitants of most of the other provinces of India. That standard should not be lowered if we are to live human lives with facilities for further improvement and expansion. The ambition of each province should, moreover, be to sustain its teeming millions and raise their standard of living. Under the circumstances measures should be adopted to raise and not to lower the Bengalee's standard of living. This is a problem for practical politicians to solve and unless solved with the least possible delay may result in the total annihilation of the Bengalee race

except as dependents of those who are neither of their Province nor of their race. And if need be, in order to protect the interest of the people of the Province, recourse ought to be had to legislation prescribing the percentage of outside labour which could be introduced into mills, factories and other large industrial concerns situated, and occupations carried on, in the Province. When this preliminary point is solved, and there is every hope of the legislature under the new constitution taking it up as seriously as South Africa has done, other problems of a similar nature and equally grave and vital to the economic well-being of the Bengalee people may be tackled. This is not a matter of retaliation but a necessity for self-preservation. The arrangement we are advocating will also rid the mill areas of disease, vice and crime. Local Bengalee labour has not been found short in the mills and factories in the mofussil where the conditions are not so bad as in Calcutta and the surrounding places, particularly in jute mill areas, where labour interests are not properly looked after. And if we are to rely upon the details embodied in an address presented to Mr. (now Sir) Oswald Mosley by the representatives of jute labour in Calcutta, in January 1925, that "the average price of jute is Rs. 16 per maund, and the sale price of jute fabrics—namely hessian and bags—about Rs. 21 per maund", we need not wonder that it is so. The margin is divided in the proportion of 1 : 2 : 3 one to the mill hands, two to the management and three to the shareholders.

(2) *Compulsory Insurance.* To achieve this object a system of Group Life Insurance is recommended. In this form of insurance all or any class of employees of one employer (individual or company) are insured, without medical examination, against death or permanent disability. There are no restrictions of age, sex or occupation. In America the total value of such policies is enormous. About 75 crores of rupees are paid annually as the share of the employers for the insurance of their workers' lives. The scheme has been adopted in England during the last ten years and most of the leading British insurance companies are doing heavy business in this line. When carefully

considered and drafted it is found that it costs the employers little, and is specially economical as while it confers inestimable benefit on the employees it pays its own way in the good-will it secures and the satisfaction it gives to the employees.

(3) *Provident Fund*. It is a kind of profit sharing. The State should insist on the employer paying a certain percentage of divisible profits to the employees. Not only public utility companies but all industrial undertakings should consider themselves joint families of which the employees are members. While in the case of public utility companies a minimum may be fixed low, in the case of others it may be fixed a little higher. The money accumulated in the Provident Fund of the labouring classes may, from time to time, be converted into shares under certain conditions.

(4) *Joint Works Committee*. The Bengal Legislative Council passed a resolution moved by Mr. K. C. Ray Chowdhury, Labour Member of the Council, on the 4th March, 1921, urging investigation of the causes of the epidemic of strikes in Bengal in 1919 and 1920 and the Government appointed what is known as the Industrial Unrest Committee which sat for several months under the chairmanship of the late Sir John Kerr and examined a large number of witnesses (workers and employers). The report of that Committee which was published on the 16th June, 1921, strongly recommended the creation of Joint Works Committees in all industrial concerns on the model of Whitley Councils in England named after the Rt. Hon. John Henry Whitley at one time the Speaker of the House of Commons and the Chairman of the Royal Indian Labour Commission—one of the greatest authorities on Labour Problem in Great Britain. These councils or committees are something like *Panchayets* to be composed of elected representatives of workers and employers. Regular meetings are to be held to discuss all matters affecting labour conditions (excepting wages), *e.g.*, holidays, leave, housing, toilet, refreshment, apprenticeship, religious worship, etc. There was fairly strong evidence before that Committee that a large number of strikes and lockouts in Bengal before 1921 were not due to economic reasons. Work

councils and shop committees are naturally disliked by Trade Unions as they tend to curb and curtail the influence of Trade Union officials over the members and foster a spirit of friendship between the industrial workers and the management.

In India the growth of honest Trade Unionism is very slow owing to prevailing illiteracy and ill feeling between groups of workmen of diverse tongues, races, creeds, castes, and origin and also due to strong prejudice prevailing among employers and the superior supervising staff against workmen combining for a particular or any purpose or attempting to bargain collectively. On the other hand the poor workmen are often exploited in the name of Trade Unions by unscrupulous promoters of *hartals* and deadlocks. One of the best methods of ensuring industrial peace is to prevent exploitation of industrial workers by politicians by mass agitation and this can only be possible by the establishment of rigorous *Panchayats* or Councils in all large factories.

(5) *Loan Societies.* The appalling indebtedness of industrial workers in India attracted the attention of the Royal Labour Commission which, after full investigation, recommended various palliative methods. The Registrar of the Bengal Co-operative Credit Department submitted a note to the Commission indicating appalling usurious practices prevalent in mill areas and their disastrous effects upon the poor mill-hands. One of the solutions lies in the formation of loan societies in different mill centres under the supervision of mill-owners and backed by their loan fund for redemption of the debts of their operatives in permanent employment. There can be no better security for advances for regular workers than their wages from which small weekly deductions may be made for repayment without letting the operatives feel the pinch of indebtedness. No serious efforts seem to have hitherto been made by the Co-operative Credit Department of the Government to create credit societies in mill areas and we do not see any reason why they should not be successful if they enjoy the patronage and co-operation of the employers. To facilitate the introduction of the above we suggest the introduction of a monthly system of wage payment.

This should not prevent the workers from getting weekly subsistence allowance for fooding and clothing.

(6) *Co-operative Stores.* Mr. J. T. Donovan, I.C.S., late Registrar of Co-operative Societies in Bengal, said in 1921 at the Social Service Exhibition held at Dacca, "Why is there a demand for co-operative stores now? What is the motive which induces men to project co-operative stores all over Bengal? The immediate causes of the increased number of co-operative stores are: (1) the great rise in prices consequent on the War, (2) a belief that traders were profiteering, (3) the general idea which had spread throughout the country as a result of the co-operative credit societies that co-operative stores can undersell the ordinary business concerns."

The first cause, viz., abnormal prices has disappeared, but the second cause still operates strongly in all mill bazars where shop-keepers often indulge in many malpractices such as higher rates and underweights, so much so that these malpractices have degenerated into even adulteration; the working class consumers dare not object because of their perpetual indebtedness to the shop-keepers. The spirit of the Rochdale Pioneers for co-operative distribution of food and clothes is not altogether lacking—specially in large railway workshop colonies like Saidpur, Kanchrapara, Jamalpur and elsewhere, but that spirit has to be fostered in jute and cotton mill centres with the help of employers. In fact the brain of the Rochdale Pioneers was Robert Owen, a cottonmill-owner of Lancashire whose memory is always worshipped throughout the British Empire as one of the greatest benefactors of the British labouring classes.

(7) *Arrangements for treatment in ailments and for the education of boys and girls (workers' children).* After remarking that labourers are almost entirely uneducated the Industrial Commission expressed the opinion that "without education, a standard of comfort that will respond to the stimulus of decent housing and to a desire for increased earnings is not likely to be attained." Facilities for medical treatment in illness is not more important than facilities for

education. Primary education, therefore, should be free and compulsory. Even comforts and encouragement such as are in vogue in Russia and which we have examined elsewhere (under the head Primary Education) may be adopted as an economic venture which promises to bring its own return. The Labour Commission's specific recommendations should be reconsidered and as many of them accepted as possible and found suitable.

These arrangements will attract more intelligent Bengalee labourers to the mills and factories in Bengal. This type of labour is more efficient and when convinced that the interest of the employers is identical with that of the employees they will no longer behave as merely hired labour, and this will go a long way to increase the output for the benefit of the concerns no less than themselves.

CHAPTER XVI

PROBLEM OF INDUSTRIAL MARKETING

In our general remarks on a comprehensive scheme of industrial development in Bengal we have tried to show how cottage industries still continue to be an important factor in the industrial life of the Province and how they are sure to retain their pre-eminent position in the Province. The small-scale industries, too, will continue to enjoy their due and legitimate share in the scheme for development along with the big industries. The three classes of industries have their recognised place in the scheme and any attempt to disturb the arrangement will not be conducive to the best interests of the Province.

The big industries, with their vast resources, as is well-known, maintain their own marketing agencies at their own cost and as they are well-organised their marketing problems are not obsessed with such difficulties as to warrant any detailed and special treatment in the first 5-year scheme of economic planning, such as we are attempting to present. But in the case of small-scale and cottage industries the question of a proper and adequate marketing organisation is one which bristles with innumerable difficulties and is, therefore, a matter of serious consideration. It must be taken into account in regard to planning. The need for such considerations is due to many factors. The existing cottage workers are not only illiterate and conservative but also scattered over an extensive area. Naturally they cannot avail themselves of the facilities of organised trade and commerce of the towns which the big industries of the Province naturally enjoy.

But no scheme of development of cottage and small-scale industries can be rendered fully effective unless it has behind it a properly designed marketing organisation. If production demands distribution, it is equally true that it depends on facilities of distribution for its development. An intensive

programme for developing marketing facilities offers good prospects of yielding substantial results.

To make these industries once more flourishing it will not only be necessary to stimulate production by minimising the cost but also to arrange for the proper distribution of the products. Facilities of distribution stimulate production. Even an artist cannot live in delighted contemplation of his own finished work—he must work for others, with some ideal recipient in view. If it is so in the case of the artist, how essential is it in the case of the worker who has to maintain himself and his family by his earnings.

Production, if it is to be successful in the matter of holding its own, must get the requisite raw materials at the cheapest possible rate. Individual cottage workers purchasing raw materials in retail have to pay a higher price than large buyers and are thus placed at a great disadvantage. The advantages of wholesale purchase are well-known. We have, of course, before us the "classic" example of the Rochdale Pioneers. About the year 1844 a few working men in Rochdale suspected that they were paying a high price for tea, sugar and such other articles, which they, at the same time, believed were not free from adulteration. They decided to club together to purchase a chest of tea and a hogshead of sugar from some wholesale dealer in Manchester. Each one of them was supplied with tea and sugar from this common stock and paid the same price for it as they had been charged at the shops. When all the tea and sugar had thus been sold, and they divided the sale-proceeds in proportion to the capital each individual had subscribed, they found that a large profit had been realised. By 1856 their society became famous as the Rochdale Pioneers and possessed a capital of about £12,900.

It thus becomes abundantly clear that the interest of the proprietors of small factories—both cottage and small-scale—will be best served if the supply of the various raw materials they use can be ensured to them from *regional depots*, to be established in areas where either a colony of cottage workers exists or a number of small factories are actually working.

These small depots can ultimately be made to federate into Sub-divisional depots and the Sub-divisional depots into District depots which, in their turn, can be affiliated to a Central Depot in Calcutta which will purchase the various raw materials required at wholesale rates and distribute them to the factories according to their requirements and requisition through the local depots situated in the different localities charging a moderate commission. A small profit on actual cost price would be charged by these depots to defray the cost of management, interest charge and reserve fund contribution.

Just as the Central Depot in Calcutta will supply raw materials to the actual workers through the District, the Sub-divisional and the regional depots, so the finished articles produced by the cottage workers and the small-scale factory workers should be collected by the regional depots and sent to the Central Depot for disposal through the Sub-divisional and District depots, thus maintaining a chain of arrangements for the supply of raw materials and the sale of finished products. The absence of such organisation is one of the vital causes of the withering away of many of our indigenous industries which were at one time the pride of Bengal and gave sustenance to a large number of her people.

One of the important side-lines of the District and Sub-divisional Depots should be small museums where the producers as also the traders and the general public would be able to study the articles which are imported into the centre and the costing charts showing the cost of producing such of these articles as can be manufactured in the locality. It will attract the attention of industrialists of the locality and the district to the possible lines of development in manufacture.

One of the special advantages, which it will be possible to derive from a Central Store in Calcutta, will be the possibility of securing and even executing large wholesale orders. It is needless to say that big consumers like the Railways or the Government Stores Department cannot be expected to split up their orders for their requirements among a large number of manufacturers, specially when there is no guarantee of the

supply of standard articles in strict accordance with specifications. But they may be persuaded to place their orders with the Central Store which will take the risk and responsibility for the prompt and timely execution of the order by even splitting up the order amongst the factories according to their capacity of production. In placing the orders the Central Store will also know the requirements of the factories in the matter of raw materials which will be supplied from the Store. The Store will collect the products, insisting on the standard required, and thus execute the order.

The policy underlying the Stores Purchase Rules of the Government is that of encouraging the industries of the country without sacrificing economy. In revising the previous Rules the Government of India have placed no financial restrictions on local purchase by the officers under the Government of India and Provinces other than Governor's Provinces and have allowed a limited preference in respect of price of articles produced in India. The latest Resolution of the Government of Bengal on the subject (No. 326 Com. dated the 20th January, 1933) states :

“The Government of Bengal, in accepting the suggestion of the Government of India, decided similarly to liberalise the existing rules as regards the power of purchase by local officers, and allow a limited degree of preference in respect of price to articles produced or manufactured in Bengal.”

Thus a new opportunity has been afforded to Bengal to develop her industries and full advantage must be taken of it. The part the Central Depot can play in this direction is evident.

The sales department of the Store will not be less important than the raw material supplying section. Speaking of the Murshidabad silk industry in 1915, Lord Carmichael suggested that the cottage workers of the Murshidabad district should be given a chance of displaying their skill in Calcutta and that afterwards a permanent sample house should be established in Calcutta where their work could always be purchased. This

plan has been tried in many cases in Europe. Exhibitions held in London had the effect of introducing to the consuming public various art products produced in the cottages of distant parts of Europe. The organisers of the revived craft of pewter and silver-work in Scotland, as we have pointed out elsewhere, find that it pays them to rent a shop window in the most expensive street in London in order to attract attention to the ware which they can dispose of. Every important hotel in England gives prominence to such articles kept in show-cases in the vestibule or some other place. Reference has already been made to the encouraging result received by the Bihar and Orissa Government regarding the sale of Bihar cottage industry products such as textile work, durries, chair seats and picnic baskets in England. All these go to show what an efficient organisation, when run on rational lines, can do for cottage and small industries. The Central Store will serve this purpose also, and serve it well.

The management of the Central Store should be vested in a Board of Trustees and the Secretary to the Board should be in constant touch with the Department of Industries which, in its turn, should keep him informed of all improvements effected in machinery and methods of production, as also supply him with such information as may be asked for.

The easiest and the most convenient way to raise the necessary capital to give effect to the foregoing scheme would be by—

- (1) Requiring the proprietors of each factory willing to take advantage of the facilities offered by the Store, to contribute a sum (to be fixed) towards the capital,
- (2) Issuing shares to persons interested in the industrial development of the Province,
- (3) Issuing debentures, if necessary.

The Store should be run on business lines with the avowed object of developing the cottage and small industries of the Province.

The Government of India are fully alive to the importance of the development of cottage industries "as a supplement to agricultural operations". In their latest resolution on rural economic planning (dated the 4th May, 1934) they said :

Special attention was given at the Conference held at Delhi from April 3rd to April 6th to industrial research and the question was discussed of establishing a central organisation for this purpose. The functions of such an institution may be somewhat as follows :—

- (1) The collection and dissemination of industrial intelligence
- (2) Collaboration with provincial Directors of Industries and industrialists in all matters relating to industrial research
- (3) Publication, at intervals, of bulletins relating to industrial research and other matters connected with industrial development
- (4) Assistance to industrialists in India by giving advice and making suggestions as to the directions in which research should be undertaken
- (5) To collaborate with the various organisations of the central and local Governments with a view to ensuring that specifications prepared or issued by them provide, as far as possible, for industrial standardisation
- (6) To assist in the organisation of industrial exhibitions in India.

Every help that this proposed institution can offer should be readily available to the Store through the Department of Industries. It will then filter down through the District, Sub-divisional and local organisations to the actual workers.

The question of propaganda, too, should engage the attention of the Central Store. It may not be generally known that when the Bengal Home Industries Association was started under exceptionally favourable auspices, Sir John Woodroffe wrote a note on Home Industries in Bengal (27th December,

1916) which was in every way characteristic of the man. He referred to the various ways in which an institution like the one then established can assist the industries and these he said "may be summed up in the word Propaganda". Said Sir John :

"So far as I can see at present the difficulty in the way of the home industries is not to find places where the goods may be sold, but to sell goods at a price which shall compete with foreign...goods...What we can do is to 'educate' the public to purchase their own goods by pointing out to all that the question of cheapness or otherwise depends on the lasting worth of the article and not its price ; and (to those who can afford it) the duty, even at the cost of some sacrifice, is to support their fellow countrymen. The society should thus be made a 'centre of activity' for the promotion of the cause by the following and kindred objects :

- (1) ascertainment of the facts by industrial survey ;
- (2) report and advice thereon ;
- (3) study of the subject in its particular branches with a view to learn what improvement may be effected ;
- (4) the holding of meetings at which such questions may be discussed :
- (5) the publication of reports, papers, correspondence in a quarterly magazine to be called the 'Bengal Review of Home Industries' or other like name ;
- (6) publication and distribution throughout the mofussil of catalogues and advertisements in the vernacular ;
- (7) the holding of exhibitions the cost of which might be met from a commission on sales, rent of stalls and entrance money ;
- (8) communications with England, the Colonies and foreign countries with a view to introduce there such Indian goods as might be suitable ;
- (9) educative propaganda of all kinds ; in short, centralization of all efforts, representation, protection and promotion of the industries."

In November, 1916, Lady Carmichael, in opening the Kalimpong Homes' sale of work at Calcutta, made the suggestion that there should be an organisation formed to co-ordinate the village home industries of Bengal and establish a depot in Calcutta for the sale of the work produced. She had been, she said, struck by the high standard of comfort which prevailed amongst the hill farms and cottages at Kalimpong due greatly to the industrial work organised by Mrs. Graham and added, "It seems to me if full advantage is to be taken of this sort of work, it will be necessary to have some fixed depot in Calcutta to which the articles made could be sent and where any one could buy those they see, and order others to be made." She suggested that such a depot should be established. She did not overlook the needs of small industries also. "If the workers are to get a fair price for their goods, there must be a wide combination of all the small industries, both for encouraging them, for showing them what is done in other parts of the country, and for disposing of them at a fair price. Nor is this all. There must be an advance of capital to enable the workers to wait for the sale of their goods. I think this is a step which would benefit Bengal."

We are not concerned here with the question of capital which can be secured from sources such as Co-operative Societies. This has been dealt with in a previous chapter. But we are of opinion that a Central Store with affiliated branches should be established in Calcutta for the supply of raw materials and the sale of finished products.

Industrial marketing arrangements and facilities are of vital importance for the successful operation of cottage and small industries. In every country in Europe and America the progressive development of industries practically hinges on marketing research, propaganda and publicity. The "Buy British" propaganda in England has no counterpart in India. And it is well-known how the Government of the United States of America advised the American consumers to buy as much American goods as they possibly could to help the indigenous industries. Most of the European countries, as also American,

have their Trade Commissioners in this country, and their duty is to create markets for the products of the countries they represent. The reports of these Commissioners go to show how carefully they study the tastes and requirements of the people with a view to inform their industrialists how best they can capture the Indian market. Japan has established a Commercial Museum at Calcutta which has materially helped the expansion of Japanese trade in Bengal.

It is a matter of common knowledge that large sums of money are spent every year by the Governments of various countries on propaganda, publicity and marketing research. In England it is well-known how large sums of money were spent for years together by the Board of Trade on the now defunct Empire Marketing Board with a view to expand the industries. The *Statesman* in its issue of the 5th August, 1933, commented on the decision of the British Government to discontinue the activities of the Empire Marketing Board and referred to "the undoubtedly enviable work which the Board has done in devising publicity schemes and improved marketing conditions". It further said, "The British Government in England could not continue to shoulder the entire cost of such an enterprise designed for the benefit of the whole Empire".

The work which the Imperial Institute (London) does in connection with investigation, etc., in tropical agriculture and industries and the commercial utilisation of the natural resources of the Dominions, Colonies and India is highly appreciated for its value and utility.

In India we are grateful to the Government of India for their decision to proceed with marketing survey, etc., with reference to agricultural produce. Reference has already been made to the Economic Conference held at Delhi. The Government of India have decided to give effect to the programme provisionally approved by the Conference which includes the following initial steps :

- (1) the appointment of a Central Marketing Officer by the Government of India,
- (2) the appointment of Provincial Marketing Officers,

- (3) the inauguration of provincial marketing surveys,
- (4) the appointment of special committees for staple crops,
- (5) work on grade standards.

We hope marketing officers would be appointed by the Central and the Provincial Governments and marketing surveys undertaken in connection with industries other than the universal but insecure industry of agriculture. The people of India must be helped to develop these industries if their economic condition is to undergo a quick and welcome change. Without in any way underrating the value and importance of agriculture in this pre-eminently agricultural country it can safely be asserted that as long as her teeming millions will depend on agriculture as their only occupation so long will her economic condition remain depressed. This has been fully realised by the Government and in Bengal His Excellency Sir John Anderson has drawn pointed attention to the existence of a mal-adjustment somewhere in the system because of which, though the Province is neither poor in natural resources nor in man-power, a vast agricultural population is kept groaning under a load of debt, eking out a narrow and penurious existence, without useful occupation for nearly nine months out of the twelve. That shrewd observer, of political affairs, the late Sir Valentine Chirol attributed the prevailing discontent in India to mainly economic causes and remarked that "there can be no better material antidote to the spread of disaffection than the prosperity which would attend the expansion of trade and industry". He expressed the opinion that it is the duty and interest of the Government of India to respond to that "legitimate form of Swadeshi" which "is bent on production in India of articles of the same or of better quality which can be sold cheaper, and can, therefore, beat the imported goods in the Indian markets". "We are bound", he said, "as trustees of the people of India to promote Indian trade and industry by all the means in our power, and we are equally bound to help to open up new fields of activity for the young Indian whom our educational system has diverted from the old

paths, and who no longer find for their rapidly increasing numbers any sufficient outlet in the public services and liberal professions which originally absorbed them”.

The Governments, both Central and Provincial, have not been totally unmindful of their task in connection with the industrial development of the country. As far back as 1883 a resolution was passed by Government expressing their desire “to give the utmost encouragement to every effort to substitute for articles now obtained from Europe articles of *bona fide* local manufacture or indigenous origin.” We have already referred to the revised Rules for Stores Purchase and also to the activities of the Government of India in the field of industrial development.

Various provinces and provincial Governments have made some useful contribution to the work by opening and maintaining emporiums for stocking and advertising the products of the cottage and small industries. Reference has already been made to the very useful work done by the Government of Bihar and Orissa in introducing the products of these industries in Europe. The endeavours of the Government of the United Provinces, too, deserve special mention.

The Government of Bengal had helped the marketing of the products of the cottage industries by an annual grant to the Bengal Home Industries Association and, later, by a subsidy to the Bengal Provincial Co-operative Industrial Society with the definite object of helping the marketing of the products of the cottage industries through the agency of the Central Sale Depot established in Calcutta under its auspices. The other activities of the Local Government in the matter of the development of the cottage and small industries have been dealt with in a previous chapter,

It is needless to say that without up-to-date information in matters of make, design, price, the sources of supply of various articles, etc., it is difficult for the cottage and small industries to retain a hold on and maintain their position in an ever changing market, and particularly in an age which, as Lord Curzon said, “is never happy unless it is deserting its own

models and traditions and running about in quest of something foreign and strange”.

It is also clear that if trade in the products of these industries is to develop, trading houses, large and small, should be established both in Calcutta and in other towns of India to bring the workers in close touch with the consumers.

Bihar and Orissa have established touch between the workers and the markets in London and New Zealand with the result that the products are in constant demand in those markets. The Madras Government have announced their intention of forming a Provincial Marketing Board to work in conjunction with the Provincial Marketing Officer.

In Bengal marketing arrangements will have to be organised. As stated in the Government of India Resolution a Provincial Marketing Officer will have to be appointed. A tremendous headway can be made if, as suggested by Mr. G. S. Dutt, I.C.S., during his visit to Krishnagar in 1933 as Director of Industries, Bengal, every District Board in Bengal appoints a District, *i.e.*, a regional Marketing Officer who will be in constant and close touch with the Provincial Marketing Officer and in charge of the District Industrial Museum. Each District Board should organise a District Museum for the benefit of the consumers, the producers and the traders of the district. Thanks to the enthusiasm and keenness of Mr. Tarak Nath Mookherjee, the Chairman of the District Board of Hooghly, a beginning has already been made in this direction at Chinsurah, and it is now up to the other District Boards to emulate this example. The District Museums should federate with the Central or Provincial Museum in Calcutta which will contain a representative collection of the articles used and the articles produced in the Province, together with all information regarding the possibilities of the existing as well as new industries. The Central depots should be under the control of the Provincial Marketing Officer helped by a Provincial Marketing Board, which will advise all purchasing departments of Government in the matter of purchase of goods.

The composition of this board may be as follows :—

The Provincial Marketing Officer (President),

The Director of Industries,

A Representative of the Co-operative Department,

Two of the District Marketing Officers selected by rotation from the District Officers,

Two Representatives of consumers (nominated by Govt.),

Two Representatives of producers (nominated by Govt.),

Principal, Government School of Art,

or

President, Indian Society of Oriental Art.

Much will depend on the energy and enthusiasm of the educated classes whose taste, formerly led into safe paths by the splendid traditions of the Indian handicraftsmen, has become changed and corrupted. They should form associations for organising exhibitions in co-operation with the District Marketing Officers, for advising producers and helping them with information, designs, etc., for inducing consumers to give preference to locally produced articles and to carry on a propaganda of "Buy Bengalee". The result will be perceptible within an unexpectedly short time.

CHAPTER XVII

INDUSTRIAL FINANCING*

It is difficult to visualize any steady or healthy development of the indigenous industries of India unless the problem is tackled as a whole, and not in watertight compartments. A complete programme of industrial development should immediately be drawn up. At the same time it should always be borne in mind that no such scheme can attain any measure of success unless all the different factors are duly considered and co-ordinated. No amount of technical knowledge or banking facilities, for example, can save an industry, however favourably it may be placed with regard to market, labour, transport, raw material, etc., if the fiscal and the currency policies of the Government of the country do not support it at the initial stages of development. Exchange rates have their effect on local industries, and contraction of credit and purchasing power of an individual vitally affect their growth. What is required is that synchronised steps should be taken, particularly in inter-departmental directions so as to make them inter-dependent, a condition which is necessary for their harmonious growth and development in all directions.

One of the most important problems in regard to any scheme of industrial recovery for the Province must refer to the provision of financial facilities for the indigenous industries, particularly the cottage and small industries. It is for lack of

* The writer is deeply indebted to Prof. Saroj Kumar Basu for the considerable assistance he has obtained in the writing of this chapter from Mr. Basu's published and unpublished papers on the subject as well as from discussions with him. Mr. Basu has made a special study of Industrial Financing in India and abroad and has collected materials from various countries of the world for his work. He is also grateful to Mr. Basu for much valuable information kindly placed at his disposal by him regarding the working of the Industrial Bank of Japan and of the principle of State aid to industries in various countries.

capital that many of our industrial ventures suffer ship-wreck, even though their system of manufacture is sound with a ready market at hand. They die of innutrition rather than mal-nutrition.

It is, therefore, our opinion that unless facilities are afforded for the provision and supply of cheap capital at a low rate of interest, the large industries, as well as the small, are doomed to failure. It is for this reason that nearly two decades ago the Indian Industrial Commission in their Report recommended the establishment of an Industrial Bank to provide financial assistance for the indigenous industries of India. But unfortunately nothing tangible has so far been done to give practical effect to this very important recommendation of theirs.

It is true a large number of banks, styling themselves "Industrial Banks", no doubt saw the light of the day during the post-war boom period but a few of them, truly speaking, were really banks and fulfilled the true functions of an Industrial Bank. No wonder, therefore, most of them had to close down. Ever since that period the question of Industrial Banks has attracted a great deal of public attention. In recent times, this subject has received an additional amount of impetus, thanks to the recommendations of the Provincial as well as the Central Banking Enquiry Committees, both of which concluded their labours sometime ago.

The necessity for "Industrial Banks" in our country has been frankly recognised. The present banking system of India, modelled as it is on the lines of the English banking system, is not at all suited to cater for the long term financial needs of Indian industries. The ordinary commercial banks receiving deposits repayable on demand, or at short date, cannot possibly be expected to undertake the risk of "locking up" their funds in long period loans to industry. They have neither the means nor the ability to appraise the value of factory buildings, plant and machinery. The constitution of the Imperial Bank also prevents it from lending money for more than six months at the most. Indian industry thus

looks in vain to the Indian banking institutions for the financial accommodation which the Continental banks readily grant to their industries. Such institutions as the issue houses, investment trusts or industrial banks, which play an active part in the financing of industries elsewhere, are also conspicuous by their absence here. Under the circumstances the difficulties under which Indian industries have to labour for obtaining the requisite finance for fixed capital expenditure are very great. The mass of evidence tendered before the Central and Provincial Banking Enquiry Committees clearly indicated that the present facilities of industrial credit in India are extremely meagre.

Before taking up the question of the establishment of an Industrial Bank for financing industries in the country, let us turn for a moment to study what the various Provincial Governments and Indian States have done in the matter of financing cottage and small industries in their respective areas. Many Provincial Governments as well as Indian States have brought upon their statute books a piece of very important and useful legislation known as "State-Aid to Industries Act." It will be interesting to study how far the Industries Acts have been able to solve the problem of industrial financing in the various provinces.

The question of State aid for Indian industries was for the first time brought to prominence by the Industrial Commission of 1916. Prior to the appointment of the Commission, some interest no doubt had been evinced by the Madras and the United Provinces Governments for the industrial development of the provinces; and these two Governments had held industrial conferences at Ootacamund and at Nainital in 1908 and 1907 respectively. These conferences made some recommendations and some action on them was taken. But there was no definite policy regarding State assistance to industries, the pursuance of which could be sedulously undertaken. It was the Industrial Commission which urged with great emphasis the importance of State aid. The Commission, besides recommending a number of indirect forms in which the State should

encourage indigenous industries, recommended that the State should follow an active policy of financing small and cottage industries principally, as also large scale industries. The forms in which financial assistance was to be rendered to the cottage and small industries should be either direct loans or the furnishing of plant on the hire-purchase system. Financial assistance rendered by the State for large scale industries, they recommended, should be by way of advancing loans, or of guarantees of dividends, or of undertakings to purchase outputs or of subscription to share capital. In certain cases where private capital was not forthcoming.

The circumstances in which the State should assist the industries were stated to be cases where a new industry would have a bearing on the economic development of the country, or where the starting of a new industry would be found to be necessary for supplying an existing deficiency in the interests of national safety or when the extension of an old industry to a new locality would benefit local producers or consumers.

The recommendations of the Industrial Commission took shape for the first time in the Madras State-Aid to Industries Bill which the Hon'ble Minister Rai Bahadur K. V. Nayudu introduced into the Legislative Council on the 14th November, 1922. It was passed into law with some amendments by the Council on the 20th December, 1922.

A Statutory Board of Industries has been created under the Act, consisting of not less than ten and not more than twelve members, of whom not more than three should be Government officials. Applications for State aid are made to this Board and the Local Government sanction them on the recommendations of the Board. The industries which receive assistance under the Act are :

- (1) New or nascent industries ;
- (2) Industries to be newly introduced into areas where such industries are undeveloped ;
- (3) Cottage Industries.

The forms of State aid are as follows :—

- (1) Grant of loans ;

- (2) Guarantee of a cash credit, overdraft or fixed advance with a bank ;
- (3) Payment of a subsidy for the conduct of research or for the purchase of machinery ;
- (4) Subscription of share or debenture capital ;
- (5) Guarantee of a minimum return on part of the capital of a joint-stock company ;
- (6) Grant on favourable terms of land, raw material, firewood or water, the property of the local Government.

Curiously enough the Madras Act contains no provision for making plant available to cottage industries on the hire-purchase system which was an important recommendation made by the Industrial Commission. It is clear that in the case of the small industrialist, unable to give sufficient security or guarantee to the Government, which is required for the grant of loan, the hire-purchase system is more suitable than the loan system.

The Act provides that State aid in any of the above forms should be confined to joint-stock companies registered in India with rupee capital, a minimum number of the members of the Board of Directors being Indian, and having arrangement for the training of apprentices as prescribed by the Government. The loans should not in any case exceed 50 per cent. of the net value of the industrial business or enterprise receiving State aid and they are to be secured by a mortgage or floating charge on the whole assets. Loans are repayable by instalments, the period within which such repayment should take place must not exceed 20 years unless the local Government extend the same. Whenever the loan shall exceed Rs. 50,000 or in any other case considered necessary, the Government will publish a notice in the prescribed manner calling upon any person who objects to the grant of the aid applied for to state his objections. The recipient of State aid is bound to comply with any general or special order of the local Government relative to the inspection of the premises, building, plant or stock in hand of the industrial business, to

furnish full returns of all products, to maintain such special accounts as the local Government may require from time to time, to permit the inspection of all accounts and to submit the accounts to such audit as the Government may prescribe.

As regards Government subscription of shares or debentures it is provided that the public subscription of share capital should be at least equal in amount to that taken by the Government and for all capital on which a guarantee of return is given, there shall be paid up an equal amount of share capital which carries no guarantee. The first loan disbursed under the provisions of the Act was one of Rs. 50,000 on the 23rd December, 1924 to a firm of silk cloth manufacturers to develop their factories. From that date to January 1930, the Department of Industries disbursed loans under the Act to the extent of Rs. 7,73,915-8-0, and of this sum Rs. 6,49,215-8-0 was advanced to a single industrial concern, viz., The Carnatic Paper Mills, Ltd.

The Hon'ble Minister K. B. S. M. Fakruddin introduced into the Legislative Council of Bihar and Orissa on the 13th July, 1923 a State-Aid to Industries Bill, modelled on the lines of the Madras Act. It was subsequently passed by that Council. In one respect the Bihar Act was a great improvement on the Madras Act, because it provided for the supply of machinery on the hire-purchase basis. This provision has undoubtedly made it highly useful to the small and cottage industrialist and is likely to prove of great benefit to him. But as regards the advertisement of loan applications with a view to invite possible objections, the provisions of the Bihar Act seem to be much more stringent. For, whenever the loan applied for exceeds even Rs. 10,000, the Director of Industries has to advertise it in the local official Gazette in three consecutive issues, a condition which cannot fail to detract from the value and usefulness of the Act.

In his evidence before the Bihar and Orissa Provincial Banking Enquiry Committee, the Director of Industries stated that 98 applications from 33 different industries were received by the Government. Of these 98 applications, 37 were

sanctioned and the amount distributed was Rs. 8,13,859 ; of these eight lakhs, five lakhs had gone to the Indian Steel Wire Products, Ltd. alone.

There is no State-Aid to Industries Act in the Punjab but there is an Industrial Loans Act which was passed in 1923. Its scope is not so wide, providing as it does for any assistance in the form of loans. Up to the year 1932 the total amount advanced under the Act was Rs. 4,61,950.

There is no such legislative provision for State aid in any other province except in Bengal and the Central Provinces. The Bengal State-Aid to Industries Act was passed in 1931. But even though no such Act exists in the other provinces, some of them have shown an active interest in the promotion of industries by rendering financial assistance. The Government of the United Provinces established in July, 1922 a Board of Industrial Loans Commission to make advances principally to small industrialists.

An examination of the affairs of the State-aided business concerns whether in Madras, Bihar, the United Provinces or the Punjab shows that the results have been disappointing. Most of them have failed to show any profits and have not been able to pay the instalments of the loans as stipulated and required by the Act. The Carnatic Paper Mills, Ltd., which received the major portion of the assistance under the terms of the State-Aid to Industries Act in Madras failed and landed the Madras Government in a loss amounting to Rs. 3,86,428. All the other recipients of State aid except a silk factory and a match factory were failures and considerable loss had to be incurred by the Government of Madras. The story is the same with the working of the Bihar Act. The Indian Steel Wire Products, Ltd., to which the bulk of the assistance was given was not a success and Government loss amounted to Rs. 2,69,328. The same fate overtook the other concerns to which State aid was extended. The scheme of advancing under the hire-purchase of machinery system also has not fulfilled expectations, for causes discussed later. The Industries

Department has even been characterised as a museum of obsolete machinery. The affairs of the State-aid enterprises in the United Provinces have been as disappointing as those in Bihar and Madras. Most of them have defaulted or have gone into liquidation. In the Punjab, the Industrial Loans Act also has not proved to be of any very great benefit to the artisans and small industrialists. The Punjab Provincial Banking Enquiry Committee has reported that the artisans and small industrialists have not been able to take advantage of the assistance given under the Act as they cannot offer adequate security. Registration and other procedure required under the Act have also stood in the way of such classes of borrowers taking advantage of the provision made. The absence of any provision for the grant of machinery on the hire-purchase system has further prevented it from being helpful to them. The history of the working of the principle of State aid has been so disappointing in all the provinces that opinion has frequently been expressed that State assistance might, after all, be wrong in principle and the utility of a fresh Act providing for State aid in another province has been seriously questioned. But we are inclined to think that it will be a little premature to come to that conclusion. There are doubtless certain difficulties regarding the administration of the Act and there may also be a few defects. With the removal of these defects, the Acts may certainly be made more useful. In fact some of the defects of the Madras Act have already been mended. Section (9) of the Act has been amended and industrial concerns are now able to obtain loans up to a limit of Rs. 40,000 even if it exceeds 50 per cent. of the net assets of the enterprise. Small concerns having assets not exceeding Rs. 500 have been exempted from the obligation to insure their properties against loss or damage by fire.

The main difficulty in the administration of the Acts has been the task of properly estimating the managing capacity and credit-worthiness of the owners of the enterprise, receiving aid, as well as the prospects and soundness of the undertakings themselves. All this has to be done under the Act by the Board

of Industries. The members of the Board of Industries are generally busy men and the enquiries conducted by the Board are necessarily incomplete. The lack of sound administrative experience on the part of the Director of Industries of a province may hamper the working of the Act a great deal. The personnel of the Board should be carefully selected. The Board is often expected to fulfil the functions of a bank for which, as at present constituted, it is not at all qualified. Hence, the Act could probably be made to work in a much better way, if it could be administered through a bank, preferably an Industrial Bank, if one were established in the Province. The provision of the Act which requires an advertisement of applications whenever the loan applied for exceeds a certain amount, which has already been mentioned, stood against its successful working. It is no doubt necessary to safeguard the interests of the tax-payers. But it injures the credit of the applicants to have to openly apply for loans which may or may not be granted. Hence a large number of deserving industrialists may quite possibly have been reluctant to avail themselves of the opportunities created under the Act and proprietors of less deserving enterprises, who may have failed to secure financial assistance from *bona fide* investors and through ordinary channels, may have reaped all the advantages. The very fact that they were willing to submit their applications to such publicity is a clear proof of their inability to secure accommodation elsewhere.

Further, the Madras and the Bihar Governments cannot be said to have been wise to crowd their investments upon a single concern, instead of carefully distributing the risks. The failure of the one concern, to which the bulk of the advance was made, necessarily landed the two Governments in considerable loss. These two Governments went in for large scale industries and the cottage industries did not benefit much. The success of a policy of promoting large scale industries depends on a large number of factors. The fiscal, currency and exchange policies of the Government have an important bearing on their developments. Without a control of all these policies by a

Government, it is idle to think of developing large industries by supplying financial assistance alone. Last, but not least, it must be remembered that it is not the State-aided industries which alone have suffered.

The unprecedented economic depression that followed the Great War has exerted its blighting influence throughout the world ; and no country and, for that matter, no industrial venture either of the West or of the East, private or State-aided, can claim to have escaped the result of this economic disaster of the world. India has, undoubtedly, been no exception to it. In India, as well as in other countries, hundreds of factories came into being financed by private capital and enterprise and in a surprisingly short period, went into liquidation. The many hundreds of liquidation proceedings in the Calcutta High Court from 1920 to 1927 will bear abundant testimony to the above assertion. *If, therefore, factories aided by the State have failed, they have failed for causes which are so common a feature in the failure of the hundreds of factories not aided by the State.*

The Bengal State-Aid to Industries Act, though modelled on the lines of the Madras and Bihar Acts, has been drafted in the light of past experience and does not contain many features which have rendered their working difficult. Its scope is wider and the forms of aid enumerated are also more extensive. The Bengal Act is chiefly meant for the cottage and small industries, though the encouragement of large industries will not be neglected. The main purpose of the Act is to train batches of educated young men in new and improved processes in certain selected small and cottage industries. Machinery will also be supplied on the hire-purchase system. Industrial Surveyors have already been appointed to collect information regarding the marketing conditions and the possibilities of a ready market for the products of the industries in which training will be given. The scheme upon which the Department of Industries in Bengal is engaged is opening up new avenues of employment to the young men of Bengal and is likely to mitigate to a great

extent the rigours of middle class unemployment in the Province. Dr. Meek himself, while Director of Industries in Bengal, had always been highly sympathetic with the aspirations of the young enterprisers and in several cases went out of his way to render them assistance. Two such instances might be given. The Imperial Bank advanced Rs. 2 lakhs each to a Soap Works and a Pottery Works on his recommendation.

It has often been urged that State assistance is wrong in principle. But ever since the termination of the War the principle of State aid for industries has found increasing favour in the civilised countries of the world. Even Great Britain, which has been so long the traditional home of "Laissez Faire" policy, has not been able to keep herself aloof from the present tendencies. In a recent publication entitled *Industries and the State* a group of young conservatives has openly declared that the argument that the industry is no concern of the State cannot be applied to modern industry at all. The Government of Great Britain has in several cases actually rendered financial aid directly, not to speak of the various forms of indirect aid prevalent. As examples of direct financial assistance rendered by the British Government, the cases of the Munster Flax Development Company, the British Dyes, Ltd., the Cunard Steamship Co., and Home Grown Sugar Company may be mentioned. Besides Great Britain, the Governments of Spain, Italy, Poland and several other European countries have, since the War, taken an increased interest in their industries.

In Spain, for example, a Royal Decree was passed in April 30, 1924, in which elaborate provisions were made for State assistance to industry. This decree replaced a similar law of March 2, 1917, which had ceased to operate on December 31, 1922. Under the terms of the Decree of 1924, all agricultural and pastoral industries, mining and its derivations, steel and metal works, factories, building and railway material constructors, hydro-electric and electro-thermic works and all allied industries are entitled to claim State aid, on compliance with certain provisions regarding the preponderance of Spanish interests. The Government has been empowered

to assist in the creation of new industries and in the development of those already existing.

In Italy also a State-controlled institution has quite recently been established known as the "Istituto Mobiliare Italiano" for the financing of Italian industries.

There is perhaps no other country in the world where State aid has been so extensively and so successfully given as in Japan. An illuminating article from the pen of Mr. Saroj Kumar Basu in the pages of the Calcutta Review very clearly indicates the important part played by State aid in building up the industrial edifice of Japan. From the earliest times the Government of Japan has been taking an active interest in the industrial development of the country. According to an eminent authority, whom Mr. Basu quotes in his article, the Government "decided what enterprises should be inaugurated ; it established them or furnished the capital for their establishment by private enterprise ; it encouraged technical and scientific training ; it imported instructors from abroad for new industries." Mr. Basu goes on to show that the establishment of the first Glass factory, the first Arsenal, the first Chemical Works, the first Silk filature has been due mainly through Government efforts. The Government also established or operated cement, bricks, and soap works, cotton and wool weaving and spinning mills, food factories, etc. According to an eminent authority, the iron and steel industry and the mercantile marine would not have been developed and would not have achieved the success they have done without Government assistance. I quote below some very interesting figures from Mr. Basu's paper to show the amount of State subsidies received by different branches of national industry :—

The Ship-building Industry

The Ship Building Encouragement Act was passed in 1896 and the Navigation Encouragement Amendment Act was passed in 1899. The amount of subsidy paid by the Governments under these Acts was 22,757,495 Yen between 1896 and 1918.

The Mercantile Marine

A total of 207 million Yen in bounties and subsidies was paid out to shipping companies during 1902—1926.

Railways

By 1927-28, the Government was paying subsidies of over 6 million Yen to 70 Railway lines.

The Dye Stuffs Industry (Established in 1915)

This industry received up to 1927, 7,500,000 Yen in subsidies and bounties from the Government.

In case of private enterprises, both large and small, infant and old (established), Government assistance has been extensively given in the forms of loans and subsidies. The annual budget regularly includes items for the encouragement of industries. Private enterprises have in numerous cases been protected by guarantee of profits.

Besides directly assisting industry by loans and subsidies, the Government from the earliest times has also made large investments in the Industrial Bank to furnish financial assistance to various branches of industry both large and small. Although the Industrial Bank of Japan has attracted a good deal of attention in this country, it does not appear to be generally known that the Government of Japan pursues an active policy of financing industries through the Bank. Prof. Saroj Kumar Basu, who has made a detailed study of the working of the Industrial Bank of Japan and who has given us much valuable information about it not available in India, has described in his article in the *Calcutta Review* the interesting part which the Japanese Government plays in industrial financing through the medium of the Industrial Bank. "Ever since the earthquake of 1923 the Government has followed the policy of extending financial assistance to small borrowers through the Industrial Bank." Again, the Deposits Bureau of the Government which is the great repository of public funds "decided after the panic of 1927 to loan 50 million Yen to small borrowers through the Industrial Bank, the Hypothec Bank and

the Co-operative Societies' Central Bank." The rate of interest for these loans, we are told, was 5 to 6½ per cent. Large sums have also been advanced by the Government to the Industrial Bank for assisting the bigger industries. In 1929, for instance, the amount invested through the Deposits Bureau in the Bank was 32,500,000 Yen which was advanced to a steamship company, a paper business company and a glycerine company.

The example of Japan proves the falsity of the argument that State interference with industry is bound to result in loss and failure. No doubt State aid has not achieved the anticipated success in the different provinces of India ; but we must remember that the present circumstances are not suitable for the prosperity of any enterprise whether State-aided or not. The nineteenth century doctrine of "Laissez Faire" has lost much of its force and the principle of State assistance has been definitely recognised to-day. Even in India the experience of more than one Native State has proved that the State can undertake active encouragement of industry without loss of the tax-payer's money. The efforts of the Mysore Government in this direction have been remarkably successful and go to disprove the assertion that the practice of State aid is unsound.

The policy of State assistance for industries was introduced in the Mysore State even before the War. In 1915 certain rules were made "for the grant of loans to facilitate agricultural and industrial operations and for the purchase and erection of machinery." These rules authorised the Mysore Government to grant loans of money for various industrial and agricultural operations. Loans not exceeding Rs. 1,000 might be granted by the Director of Industries and Commerce and that of larger sums by the Government. All loans should be recoverable as arrears of land revenue. Since the introduction of State-aid, the total loans sanctioned amount to Rs. 14,35,124-3-6 of which the sum of Rs. 54,803-2-10 only has had to be written off. This shows that the working of the principle of State assistance has not at all been unsuccessful there.

In the other Indian States, too, which have adopted the policy of State aid, it has not been such a failure as it has

been in British India. There is a definite attitude of sympathy and encouragement. There is also a carefully planned and all round policy of assistance. Not only financial assistance is given but the taxation, railway, and the tariff policies are also conducted in such a manner as not to nullify the benefits of direct assistance. In British India, Industrial Development is in the hands of the provincial Governments, but the various other factors on which industrial development depends, *viz.*, tariffs, railway rates, taxation and currency policies are controlled by the Central Government. This division of functions between the two must have hampered, to a great extent, the success of the working of the State-Aid to Industries Act in British India.

The condition of Japan was to a great extent similar to that prevailing in India to-day. The bulk of the people there were agricultural, the supply of capital was hopelessly inadequate for the rapid industrialisation of the country, the industrial classes were unable to cope with the great task before them. The people looked to the Government for assistance. Hence the Government had to enter the industrial sphere. It took upon itself the task of initiating the industrial progress of the country. From 1865 to 1893 the industries were mainly undertaken and nursed by the Government. Since that time up to the present the Government has maintained the same initiative and it will not be wrong to say that almost all the industries of Japan owe their development to the efforts of the Government. Whatever might be the part played by other factors, rightly observes Mr. Basu, it must be admitted that the Government has been mainly responsible for the rapid industrial advance of Japan.

In India the same conditions persist, the same lack of capital, the same want of private initiative and an attitude of dependence upon Government which is almost traditional.

Under the circumstances it is reasonable to believe that the efforts of the State in the direction of the country's industrial promotion will also be crowned with success. To achieve the results obtained by the Japanese Government, it must be

remembered that the Government there is a highly Nationalist Government with an attitude of active encouragement and moral support for the indigenous industries. The currency, exchange and fiscal policies, vested as these have always been in the hands of the Nationalist Government, have not hampered the working of the principle of State aid there as they have done in India. The Government also helped the industrial development in many other ways besides providing financial assistance. Experts were brought from foreign countries to establish new industries. The introduction of many new industries in Japan, such as the silk industry, etc. has been due to these foreign experts.

The policy of administering State-aid frequently through the Japan Industrial Bank may usefully be followed in India. As I have already pointed out, the failure of the State-Aid to Industries Acts in Madras and Bihar has been to a great extent due to the fact that the Department of Industries has had to function as a bank for which task it is absolutely unsuited and unqualified. Hence, if an industrial bank is started in each province, with some measure of Government assistance, such as Government subscription of a portion of share capital and a guarantee of the interest on its debentures for 5 years, such State-aid may be administered through the Bank. The Government might also lend certain sums to the Bank at low rates of interest for advance to industrial concerns. The technical questions connected with an enterprise applying for aid may be decided by the Government industrial experts and advice may be given accordingly. But the Banking functions should not be performed by the Department of Industries and should be left in the hands of the Industrial Bank. So long, however, as an Industrial Bank is not established in the Province, we would suggest that the working of the State-Aid to Industries Act in Bengal should be exclusively confined to cottage and small industries.

The provision of financial aid to such industries only will, in our opinion, save the Government from the disastrous losses which were incurred by the Bihar and Madras Governments.

But here again the administration of the Act should be very carefully carried on. We would take the liberty to make the following suggestions to improve the working of the Act in Bengal. In every case of financing cottage industries, the Statutory Board must, with the help of experts, reasonably satisfy themselves that the system of manufacture followed in the factories that the Board is about to finance, is really economic and that whatever is manufactured will have a reasonable chance of being economically marketed. In other words, any applicant for a loan must furnish a statement showing in detail the economics of his manufacture and the corresponding selling price of similar products in the open market. If these factors bear a reasonable proportion a loan may be sanctioned. It is not known whether the Punjab or the United Provinces Board, when sanctioning loans to small and cottage industrialists, ever made enquiries to the above effect.

In order to assess the likely profit of a concern, it is essential that every application for a loan must accompany a chart or charts showing the economics of its manufacture, *i.e.*, the cost of production of the articles it places or is about to place in the market and their market rates. Without an assessment of this factor the working of the Act is bound to result in failure.

The period of loan, *viz.*, 20 years is, to our mind, too long in the case of the supply of machinery on hire-purchase. It is well known that the life-time of no machine exceeds 20 years. This means, along with the repayment of the loan, the machine becomes a scrap-heap and the proprietor has to struggle again to renovate the concern if he should, as he must, keep pace with advanced methods of manufacture and be in the market. Besides, in the modern age, machines frequently undergo radical changes in design and if, therefore, the loan is not repaid within 5 to 7 years the purpose to which the loan is applied will be entirely defeated. This argument only holds good in the case of supply of machinery for the small industries.

In order to assess the managerial capacity or the profit of a concern it is obvious that the Board of Industries under the

Act, in the absence of an Industrial Bank, must be guided and helped and advised by a small committee of expert bankers who have intimate knowledge of industrial financing. Industrial financing is so radically at variance with that of other business that it is only experts on industrial banking who can materially help the Board of Industries. The members of this special Sub-Committee can be co-opted by the Board under powers of co-option given to the Board.

Power should be given to the Board of Industries to sanction a loan up to a limit of Rs. 1,500 without reference to Government. This procedure will simplify matters. A happy feature of the Bengal Act was that there was no statutory provision requiring an advertisement of loan application in the local Gazette. But the rules framed by the Government of Bengal for the operation of the Act, which were published in the *Calcutta Gazette* on the 15th June, 1933, have unfortunately imposed the condition of publishing the name or names of persons applying for loan. While fully appreciating the necessity of such a rule to safeguard the interest of the tax-payers, we must say that it is bound to scare away the right type of person who has both the capacity and the will to make the best use of the aid of the description under discussion. It is a benefit given not to him but through him to the country. Persons, *bona fide* businessmen and manufacturers, who apply for a loan do so under pressure of necessity, often in hopes of a better prospect, oftener with the determination of improving their factories capable of turning out better wares to be more in demand yielding larger profits to enable them to pay off the loan at the soonest possible opportunity. It is inconceivable that any such businessman will ever think of openly and publicly sacrificing his credit-worthiness for loans. The banks also advance loans. Do they ever advertise the names of applicants for loans from them or publish the names of those who are already on their loan register? If banks can successfully carry on the business of granting loans without giving publicity to the names, etc. surely, in our opinion, the Government also can do this. Banks have reliable agents whose business

it is to enquire and know all about the credit-worthiness of an applicant for the loan and submit his report confidentially to the authorities for them to decide upon the action to be taken.

The real solution of the problem of industrial financing lies in the immediate establishment of an Industrial Bank for the Province. To finance big industries requiring large and long term capital, the machinery of an Industrial Bank is ideally adapted. It is well known that such banks exist in other parts of the world. Specialist institutions for financing industries have been established with or without State aid in a number of countries.

The great German Industrial Banks (the D. Bank) did the pioneer work in this direction. "Germany was a poor agricultural country in the fifties of the last century. It was the *Schaff han sen scher Bank vrein* that began industrial banking in 1848 and completely changed the outlook and prospects of industrial finance. The D. Bank, subsequently established, maintained the tradition and the country was quickly transformed from a mainly agricultural to a preponderatingly industrial country. The same policy was followed in Belgium (five big Banks), France (Banque D' affaires the Banque De Paris et de Pays-Gas), Switzerland (Trust Banks) and other countries, including Japan. The Industrie Hypothek Bank of Finland, established in 1924, also makes it its business to encourage industries by granting them long term credits.

Even in the case of England, the Committee of Finance and Industry has recommended in their recent report the establishment of a specialist institution with a large capital and an expert staff for founding companies for new enterprises and also securing the underwriting of and issuing the securities of industrial companies to the public. The establishment of an institution on the lines of the Japanese, Continental and the proposed English Institution will undoubtedly be highly beneficial for the Indian industries.

The framing of a definite scheme for an 'Industrial Bank' is not at all an easy matter. A large number of factors have

to be taken into consideration, before any such scheme can be drawn up. We would nevertheless venture to indicate some of the broad lines on which such a scheme can be framed.

The first question that naturally arises is whether there should be an All-India Industrial Bank with branches in the various provinces or independent Provincial Industrial Banks. The subject has been thoroughly discussed by the Central Banking Enquiry Committee in its report. There are undoubtedly some advantages for an All-India Institution. The chief of them are firstly, that with an All-India organisation, investments might be spread out among diverse industries and thus a wide distribution of risks might be secured; and secondly, it would provide a central agency for the issue of its own debentures and of the industrial securities. But we are inclined to think that the balance of advantages will lie in the establishment of Provincial organisations. The main considerations which would impress one in favour of a Provincial Industrial Bank relate to the question of assistance to the smaller and cottage industries and the administration of the State-Aid to Industries Act through it. An All-India Bank with a provincial branch would hardly be able to devote the same attention to the needs of the minor industries as an independent provincial institution should. Besides, there is the consideration that administration of industries is under a Provincial Minister, and is likely to remain a provincial subject under the new constitution to be introduced in future. It is proper that the provincial Governments should, therefore, participate in the shares and debentures of industrial banks and also frame rules for them and supervise and control their working. The Central Banking Enquiry Committee after examining the subject in great detail has also decided in favour of provincial institutions. The bias of the "foreign experts" who were invited to assist in the deliberations of the Committee was entirely for an All-India Institution, but it was only when the constitutional difficulties were made plain to them that they modified their views. Hence, we are inclined to think that it is desirable to establish Provincial Industrial Banks;

and we hope that the province of Bengal will lead the way in this matter. In regard to the introduction of the State-Aid to Industries Act, Bengal lagged considerably behind Madras and Bihar. She came to bring on her statute book such an enactment nearly ten years after Madras. Let the pioneer Industrial Bank be established in Bengal to serve as a model for other provinces.

Owing to the national importance of industrial banks, the government should take an active interest in their management and formation. Wherever there are specialist institutions for the financing of industries, the State is generally interested in them in some form or other. In the case of the Japanese Industrial Bank, though the Government does not participate in its capital, there is Government control. It was established under a special charter and put under the direct superintendence of the Finance Minister who appoints a comptroller to supervise the management of the Bank. The president and vice-president are appointed by the Government from among the shareholders. Besides having given a guarantee of a 5 per cent. rate of return on the shares for the first five years, the Government guarantees the capital redemption and interest payment of the loans floated by the Bank in foreign countries. In the cases of industrial banks elsewhere the State has been known to subscribe a large portion of the share capital and also to lend its own credit to them whenever that was necessary in the interest of the public. Not only do the banks enjoy some form of State assistance, but they are also granted special privileges by the Government and the Central Bank of the country.

Bearing all these things in mind, we would suggest the following outline as the framework of the constitution of an Industrial Bank for Bengal.

The Industrial Bank in Bengal should be incorporated under a special charter from the provincial Government. This charter should be for a sufficiently long period, say 30 years, and should be renewable at the end of the period at the option of the Government.

The authorised capital of the Bank should be at least three

crores, the minimum paid-up capital being at least a crore and a half with provisions for increasing the capital according to requirements. The Government of Bengal should subscribe to at least 50 per cent. of the share capital of the Bank and the balance should be left for subscription by the public, banks, industrial and insurance companies. Non-Indians may be allowed to subscribe to the share capital of the Bank but not beyond 25 per cent. of it. The Bank should be empowered to supplement its share capital by issuing bonds both in India and abroad. It is desirable that the excessive issue of bonds should be prevented. Wherever there are mortgage banks, industrial or agricultural, the amount of bond issues is limited to a certain portion of the share capital of the mortgage institute. The restriction that has been suggested by the Central Banking Enquiry Committee is in the proportion of 1 : 2. The bonds, according to them, should not exceed twice the amount of the share capital. To our mind it appears that the restriction has been too great, for it might fall short of reasonable requirement. We would suggest that the bond issues should be limited to 5 or 10 times the amount of the paid-up share capital of the Bank. Such bonds, including external and internal, should never exceed the total of the outstanding long term loans and securities held in its portfolio. The Government should guarantee both the repayment of capital and the interest on these bonds which should be trustee securities. The Board of Directors should be very carefully formed. Besides the representation of the shareholders, financial, commercial and industrial interests of the areas served by the Bank should have adequate representation on the directorate. In view of the Government subscription to the share capital of the Bank and the Government guarantee of the capital and interest on its bonds, the Government should have the right to nominate three of the directors to keep watch over and safeguard its interests. For the same reason the Government should have a voice in the appointment of the chief officers of the Bank.

The business of the bank should be :

- (1) To grant long term loans for machinery, factory build-

ings and other immovable assets up to 50 per cent of the value of the property. The loans in favour of industrial enterprises should not be for more than a period of 10 years.

(2) To subscribe to the share and debenture of industrial companies and underwrite the same whenever advisable.

(3) To guarantee interest of industrial debentures or loans as may be approved by the Government.

(4) To receive deposits of money for more than two years from the public.

(5) To receive deposits on current account for one, six or twelve months from the enterprises which are or may be the constituents of the Bank.

(6) To grant temporary loans to the Bank's clients in the form of acceptance or in the form of a discount of their bills or even against fixed assets. Objections may be raised against the acceptance of deposits by a State institution, which would otherwise have gone to the commercial banks. Hence it may be laid down that the Bank's board should not fix rates which might possibly compete with the rates offered by the ordinary commercial banks. The Central Banking Enquiry Committee wanted to confine the assistance of the Bank to the provision of long term loans only. But it should be remembered that the securities held by the Industrial Bank may include a general charge on the assets of the industrial concerns and may thereby render it very difficult for them to go to other banks or agents for current finance. Hence, we are inclined to take the view that the Bank should have the power sometimes to grant short term loans to its clients.

(7) To supervise, direct or control the working of the industrial concern assisted by it by appointing one or two of its officers on the Board of Directors.

(8) To administer the State-Aid to Industries Act ; the future Reserve Bank of India should render financial assistance to the Bank whenever necessary.

The profits of the Bank should be distributed after contributing to a suitable Reserve Fund and to an adequate sinking fund for redemption of its debentures.

The Government should place at the disposal of the Bank the services of its technical and industrial experts to assist the Bank in the examination of the industrial propositions and possibilities placed before it for financial assistance. The Bank should also have special departments in charge of experts and trained men of experience whose business will be to scrutinise all the schemes of the Bank's industrial customers and to advise them whenever necessary. The intelligence department of the Bank should be highly organised so that there may be no difficulty to arrive at a proper estimate of the credit that may legitimately be granted to a customer. To be useful and reliable the activities of the department must be confidential.

The administration of the State-Aid to Industries Act should be as far as possible handed over to the Industrial Bank in Bengal. As stated before, one of the main reasons for the failure of the working of the State-Aid to Industries Acts in the other provinces is, in our opinion, that the Department of Industries has had to function as a Bank for which it is absolutely ill-suited. The Statutory Board of Industries, which under the Act examines the various proposals for financial assistance, cannot be expected to properly assess the credit-worthiness or financial soundness of the applicants for assistance. These are the functions, properly speaking, of a bank and should be relegated to the future Industrial Bank. Banks have their own intelligence departments which by obtaining information from various channels, by observing the operation of the dealers in the markets, by studying balance sheets, etc., and in various other ways are able to assess properly the financial standing of a person or a concern, and the amount of credit that may legitimately be extended to the same. The Department of Industries should work in close collaboration with the Industrial Bank. The Technical and Industrial experts of the Government will examine the technical side of the business applying for aid and will advise what appliances should be used, what improved processes might be usefully adopted and so on. But the task of ascertaining the financial soundness of the concern applying for State-Aid and the credit-

worthiness of the applicant should be left to the Bank to investigate into and satisfy itself. We have the precedent of Japan granting State aid through the Industrial Bank there. The Government of Japan has rendered financial assistance to large as well as small industries through it. In Spain also, when the Royal Decree for assisting industries was passed in 1924, it was intended that loans under the Decree should be effected through the Banco de Credito Industrial. Direct financial aid to industries by the Government is likely to involve serious risks.

There is, however, one point to be kept in view in this connection. The Industrial Bank will be established in the metropolis and for some time it cannot have branches all over the Province, although we visualize a stage when there will be a net-work of branches in all important centres of the Province with eventual connections to the village organisations referred to earlier. But State aid to industries functions in all parts of the Province. It will, therefore, be necessary till sufficient branches of the Industrial Bank are established to operate the State-Aid to Industries Act for cottage and small industries in remote centres through the Industries Department. The prospective and actual big industries can, however, approach the Industrial Bank in the metropolis.

In the administration of State-Aid to Industries Acts, there has frequently been a delay in the disbursement of loans. It has been often found that the need for a loan has disappeared when the loan was actually disbursed. The failure of the measure was largely due to this factor. If the Act is administered through the Bank, there will be no such difficulties.

It is necessary that some statutory obligation and restrictions should be placed on the business of the Industrial Bank. The assistance rendered by the Bank should be confined only to those industries that are definitely *national* in character. It should also be laid down that the Bank should not invest more than a certain portion of its resources in any particular industry or in the same kind of industries.

The Bank should actively engage itself in establishing new

industries whenever sound propositions are placed before it. It may do that by underwriting share capital or by subscribing to it. When the industry is established, it can unload the shares and turn to new propositions. The Bank will naturally be represented on the Board of Directorate of the companies thus helped. Further, the Bank will be able to exercise judicious control over the activities and policies of the industries receiving assistance and help in stabilising them.

In conclusion we would like to emphasise the desirability of establishing industrial banks immediately. The present time, when there is a wide-spread depression in almost all the industries, has often been characterised as inopportune for the creation of such institutions. It appears, however, that the difficulties through which industries are passing at the present moment are precisely the reasons why such institutions should be started immediately. It has never been easy for Indian industries to secure their requisite finances, whether for short or for long term, and the difficulties of obtaining them to-day are indeed very great. Banks are reluctant to grant accommodation, and even the Imperial Bank has severely curtailed the cash credits it used to grant to the cotton and other industries. Industries are finding it extremely difficult—almost impossible—to obtain even their current finance, not to speak of funds necessary for schemes of reorganisation and rationalisation which the present depression is demanding of them more than anything else. The creation of an Industrial Bank at the present moment may prove to be highly beneficial to Bengal industries and may even save a great many of them from impending annihilation.

The question as to how Industrial Banks can render financial help to millions of cottage workers of this Province individually may be briefly discussed. It may be argued that it will perhaps be found unsuitable for financial institutions operating either in Calcutta or even in District towns to extend financial assistance to individual cottage workers scattered throughout the length and breadth of the districts. But every

difficulty has its solution and this problem must have a solution also.

What is proposed is that banks can successfully carry on the financing of industries if local organisations are developed in suitable areas where a colony of industrial workers are found to be working ; these local organisations, to our mind, should have affiliated to them a number of cottage workers, even up to 500 in number, and these local organisations should have the powers of a branch Industrial Bank which could function directly as a branch of the main Bank.

The local organisation should have attached to it a small depot which will be divided into several portions. One portion of the depot may be used for storing suitable raw materials for distribution amongst the cottage workers of the locality. The cottage workers will have the advantage of getting the right type of raw material at a much cheaper price than what they would otherwise have if individual purchases were resorted to.

In conclusion, we can only say that the scheme outlined here for the establishment of an Industrial Bank with branches in every district should be regarded only tentative in character, so as to provoke thought and attract attention of those best qualified to advise. If such thought is properly and systematically bestowed on the question of the formation of an Industrial Bank there is no doubt that a fuller scheme may emerge as a result of discussions and conferences.

CHAPTER XVIII

INDUSTRIAL RESEARCH AND MUSEUM

The value of industrial research cannot be over-estimated. It is the mother of new industries and it nourishes infant industries with fresh and healthy knowledge. It saves the old industries from the attack of up-to-date scientific manufactures and comes to their aid in the face of competition from the world at large. If the country is to be saved from the folly and danger of putting individual fancies into action, if the country's industrial march is to be led well-ordered and well-disciplined, industrial research must be the guiding force. It is both prospective and retrospective. It is constructive as well when wisdom of industrial research enables a country to catch time by the forelock and save its industries from their erratic movements. This is an age of science and the application of science to industries ; and science is a mighty equaliser. It has brought many young nations to the forefront of industrial advance. It is as capable of bringing industrial advance. It is as capable of bringing industrial leadership for our country.

In a province like Bengal, as has often been the case with all countries possessed of a past, industries are mainly guided by customs. They are unwritten annals of past experience derived more from freaks of chance than from intelligent experiments. As they are unwritten, they sometimes die with their authors, and as they are often unintelligent acquisitions, they sometimes live as a body of dogma. Customs have got their bonds ; they are blind. If industries are to be led forward with eyes wide open, they require to be energized by new researches. Old customs and experiences will supply data on the one hand, existing practices in the advanced countries will supply premises on the other, and up-to-date scientific knowledge will throw light on both. One function of industrial research will

be to record local customs and experience and to place them side by side with those in other countries. The Research Branch of our Planning Department ought to be a record office of the annals of industries in all ages and climes.

The Record Office will be a clearing house of all the results of research at home and abroad ; it will be a reservoir to supply all technical information, and it will be a pivot of co-ordination in research. With these ends in view the first conference of Research Associations in Great Britain (1919) proposed for the establishment of a Record Bureau for a comprehensive collection of information relating to research at home and abroad and to draw the attention of those likely to be interested in them. In an executive order giving permanent lease of life to the United States National Research Council, President Woodrow Wilson stated in 1918 that one of its objects would be "to gather and collect scientific and technical information, at home and abroad, in co-operation with governmental and other agencies, and to render such information available to duly accredited persons". It was for the same purpose that the Institute of Science and Industry of the Commonwealth of Australia established a Bureau of Scientific and Technical Information.

The function of the Record Office will not be merely passive. It will be something more than the business of compilation. The Record Office will be the whole spirit to bring co-ordination in industrial research. The co-ordination will be among men and matters. Firstly, by keeping the research-workers well informed of advances already attained and the researches already undertaken and being carried on in different laboratories, the Record Office will prevent overlapping of research and consequent loss of money and energy. Such chance in overlapping will also be eliminated by annual conferences between the research workers in different laboratories. Speaking from the chair in the Second Conference of Research Organisations (1919) Lord Balfour advised his audience that unless it was desired to suffer from disastrous overlapping, to lose all the advantages which inter-communication between

persons similarly engaged produces and has always produced in the history of the world, it was necessary that all should meet together from time to time to interchange ideas. Secondly, the Record Office will co-ordinate matters. When, for example, Chemistry will supply it with knowledge of new chemical properties, the Record Office will bring them to the mechanical test in order to measure the chances of their manufacture on an industrial scale. The wealth of information which Physics, Chemistry, Botany, Geology, Engineering, etc., so far contain, will be co-ordinated to help the economic manufacture of a certain commodity. At every stage of manufacturing process the Office will come to its aid by pooling knowledge from all sources. To serve all these ends, the Industrial Research Office will contain, besides its test-tubes in the laboratory, a library of necessary scientific treatises and journals from which useful discoveries will be picked up and placed before competent researchers and industrialists for experiment.

A necessary adjunct of the Record Office is the Industrial Museum. It will embody in itself the materials of industrial research as well as the achievements of it, whether at home or abroad, whether in the Central Laboratory or in the associated laboratories. It will impart practical knowledge on the raw materials for work, exhibit the ideals to be attained and give a picture of success so far obtained. The contribution of the museum to the advancement of knowledge has been immense. Its utility in scientific investigation is undeniable. No one who has walked between the lifeless bodies and stones of a science museum will realise how enlivened he was by those dummies. As a laboratory imparts knowledge through a process of transformation, a museum helps knowledge by a picture of actual conditions. While in the former the knowledge is dynamic, in the latter it is static.

The industrial museum will contain three main parts. One part will contain the raw materials of research. India's mineral wealth, agricultural produce, woods and herbs, etc., will be among its exhibits. Their utilities, the processes of their exploitation, will all fall within its scope ; side by side with

them will be the raw materials obtained outside the country with description of how they can best be obtained and brought to the service of industries at home. Our industrial museum will contain all the materials for a full comprehension of economic geography.

A second part of the industrial museum will contain not the raw materials but the industrial products themselves. Its windows and glass cases will exhibit the achievements of industrial research not only in this country but also in all parts of the world. The contrast between the produce of the same nature will show in all their bareness where we stand and what is the ideal to be attained. When the achievements obtained by gradual developments will be shown in their historical perspectives, they will not only serve as causes of self-inspiration to the servants of research but also will carry the conviction of the country to their side. There can be no better advocacy in favour of industrial research than the researches themselves.

The third part, and also a very necessary part, of the industrial museum will be the pictorial corner of it. Its pictures of mines, workshops, agricultural fields will inspire people to adopt a life of industrial enterprise. Adventures of man over land and water, on the surface and in the womb of the earth, are like romances to attract youthful minds to them. The graphical and statistical representation of the achievements of industries and industrial researches will stand as positive proof of the fruits of industrial planning and industrial research. With these three departments of the industrial museum, the Record Office will extend a well-equipped home for industrial research to the active and to the potential energy in the youth of the country. The most important part of industrial research is something more than a record of facts. It is to carry on actual scientific investigations and experiments with a view to their utilisation for industrial purposes. Such research may be carried on by gigantic business concerns in their own laboratories, by the special scientific associations and institutions, by the Universities in their departments of science, or by any central laboratory for this particular purpose, if possible.

It is to these scientific investigations and discoveries that the term "Industrial Research" is usually applied. In describing the industrial research in the United States, Mr. Fleming differentiates the researches which are undertaken for the purpose of furnishing material for industrial development from those undertaken by scientific men for the purpose of widening the boundaries of human knowledge, by stating that while the former is definitely organised to cover certain fields of science, the research in pure science is more spontaneous and depends more on the initiative and will of individual workers. Yet the latter provides raw material for industrial research.

The part which the Universities can play and should play in showing the way to the application of science for the benefit of industry is immense. The country which has been the pioneer in this direction is Germany. She came late in the field to bid for industrial supremacy, after getting herself freed from the shackles of her own inter-state tariff problems. That was in the early part of the last century. Germany looked to her Universities to bring systematic scientific research to the service of industry, to produce batches of young Germans trained in the industrial sciences and to make the University laboratories centres for carrying on researches of industrial value. While in other countries scientists were busy in finding out the principles of pure science, the pupils of Liebig, the father of German chemical science, quick to grasp their principles, were busy in finding out their practical significance and turning them to account. The example of Germany was followed by Austria, Switzerland, and other countries on the continent which were late in stepping into the field of industry. The Universities, the schools and the technical institutions were all inspired by two main ideals—political discipline and industrial leadership.

In those States of the United States of America where agriculture is particularly predominant, efforts are made to utilize the research facilities of the Universities and Colleges in the interest of the local industries. Besides the researches ordinarily carried on by the teachers and the students, the staff

does research for private firms. "This research is generally directed to the solution of some specific industrial problem, and carried out at the expense of the firm for whom it is done. In most cases the results are not published. Sometimes the problems may be of such a character that the college authorities are prepared to carry out the investigations free of cost, reserving the right to publish the results". In certain Universities there are experiment stations attached, where the University staff and the students devote, either entirely or in conjunction with regular educational work, to the work of industrial research. There is a tendency to specialisation in different branches in these universities.

England, compared to her long history of industrial supremacy, has been late in bringing University science to bear upon trade and industry. Industrialisation in its modern form commenced in England late in the 18th century. Competition from her neighbours was then very weak. England had an easy way to industrial leadership; her discoveries, evolved in the light of experience, kept England in the forefront. Subsequently when she realised that equally well-organised and well-equipped competitors had come into the field, she grew eager to apply scientific knowledge thoroughly and effectively to the trade and manufacturing processes. The reconstitution of the Imperial Institute in 1902, the opening of the National Physical Laboratory in the same year by His Majesty—then Prince of Wales—were all inspired by the same ideal. The Imperial College of Science and Technology was founded in 1907 by a Royal Charter to give the highest specialised instruction, and "to provide the fullest equipment for the most advanced training and research in various branches of science specially in its application to industry". In the counties, at first technical institutions and then complete Universities grew up to respond to the call of industries for scientific aid.

The country—the people and the Government—should look to the Universities to take part in industrial research. The students and staff have got a great role to play in this direction. Stirred by this ideal Sir Rashbehary Ghosh and Sir Tarak.

Nath Palit made their munificent gifts to the University of Calcutta of which the present Science College is the child. But these endowments fell far short of the requirements. It devolves on the Government and patriotic persons of the country to supplement the work which has already been begun. Government may encourage particular branches of research by large capital grants and big business magnates may make large endowments for similar purposes.

Besides these grants, periodical stipends should be given to research workers. In this connection mention may be made of the grants made by the Committee of the Privy Council for Scientific and Industrial Research to the research workers in educational institutions of Great Britain. Maintenance allowances were granted to students for undergoing training in research ;—personal payments were made to professors with their research assistants engaged in scientific investigations. The grants were made on the recommendation of responsible professors and they varied according to circumstances. Except the condition that these recipients would remain engaged in research works, there were no other conditions attached to these grants. There is one important point in this connection. This is the right over the results of any important research. Whether the grants are made by any Firm or Association or the Government, the research worker will have complete right over his attainment. This point was particularly pressed by certain speakers in the First Conference of Research Organisations in Great Britain (1919). It rests on the courtesy of the worker to hand over the result to the donors and also on the donors themselves to reward the workers properly.

This method of encouraging industrial research through Universities is not direct and its achievements are not immediate. Nor in the present state of the finance of the Government of Bengal or in the disposition of the rich or the industrialists towards encouragement of scientific education and culture is it within expectation that any big donation will be forthcoming in the immediate future. For any plan covering five years this method will be quite futile. As, however, the spirit of the plan

is sure to outlive its span of life, it can only be recommended that by conferring more liberal honours on the scientific investigators for their discoveries and by raising the status of the scientists in public esteem, industrial research can be brought to the service of the country on an increasing scale. It also rests upon the industrialists to contribute their mite in this direction by securing the services of really trained scientists for their concerns rather than being led by the idea that practical experience without any back-ground of scientific education is more serviceable than University education in industrial science. Education in industrial science raises the very standard of industries. Its achievement is steady and sure.

Yet no nation can place sole reliance upon the University laboratories to supply all the needs of industrial research. The very traditions of University tend to nurse an atmosphere of theory. Those who have been trained only in the laboratory find it very difficult to grasp the practical problems of an industry. There are questions which arise in the process of manufacture and which necessitate practical knowledge for the very conception of their nature. To take an instance from the stock of experience of the Department of Industries, Government of Bengal, the Rice Millers' Association of Bengal, who imported some years ago a modern plant for drying boiled paddy, found that in course of drying in this artificial drier*the rice developed a fungus growth over its surface, which made the produce quite unmarketable. Such experiences, when they arise require to be dealt with immediately. No student of science without having preliminary knowledge of the process can grasp the fact for his investigation. There may be other cases which cannot be brought before the University laboratories with proper regard for trade secrecy or market credit. As the control of industries, big or small, over Universities is very weak, it is not possible for the industries to make the University laboratories an experimental house to serve their purpose at every process of manufacture and to enlighten them on all points which arise along with the process. It, therefore, devolves upon the industries to equip themselves with laboratories for their own purposes.

Only giant industries can afford to have their own laboratories. The steel, engineering, railway, and similar other industries by the very nature of their size, the chemical industries by the very nature of their work, etc., can possess private research laboratories. For example, the famous manufacturers of photographic apparatus, chemical papers, films, etc.—the Kodak Company of America—have got their own research department to carry out such scientific investigations as are necessary for the control of manufacturing processes and particularly for carrying on “original research of a purely scientific character such as would enable the Company to maintain its position in the front rank of photographic industry”. The General Electric Company of America—one of the largest manufacturers of all kinds of electrical machinery and apparatus—maintains a number of laboratories for similar purposes. It is useless to multiply examples. The fact is clear that it is only within the competence of big concerns to be able to maintain such laboratories. Those companies in Bengal—their number must be very few—which can afford to have their own laboratories should establish one for guidance and enlightenment. The rest must look to the other forms of research organisations.

Bengal is particularly concerned with this last problem. This is a Province where, excepting certain extractive industries such as mining or only a few textile industries, all the industries which prevail overwhelmingly are either small or cottage industries. If industrial research is to come to their aid—and our main aim ought to be to find out how it can—some sort of common organisation should exist for industrial research. The best way is for the several kinds of industries to form research associations and to pool their funds to erect industrial laboratories with the help of the Government, where common research for each group of industries will be carried on. When any particular firm will desire to have a problem examined it can be placed before such laboratories on condition that due secrecy will be maintained. The several groups of

industries will have their separate research associations and research institutes.

Such research associations have been very common and frequent in Great Britain since the exigencies of the War compelled the Government in 1915 to advance a scheme for the organisation and development of scientific and industrial research, of which the Committee of the Privy Council for Scientific and Industrial Research with its Advisory Council was the outcome. These research associations are just like other associated bodies with memoranda and articles of association. The British Scientific Instrument Research Association, the British Research Association for the Woollen and Worsted Industries, etc., may be mentioned as typical instances. The British tradition for working in guilds and societies has favoured the wide-spread adoption of this method of research. This is a co-operative method of industrial research. Reporting in 1927 on the advantages offered by these research associations to their members, Lord Balfour wrote as under from which the nature of working of research on account of the members can also be gathered :

“Members of research Associations have the right :

- (i) to put technical questions to the staff of the Association and have them answered as fully as possible within the scope of the research organisation ;
- (ii) to recommend specific subjects for research and, through the Council of the Association, to have a voice in the selection of the programme of research ;
- (iii) to the use without charge or on reduced terms of any patents resulting from research ;
- (iv) to ask for a particular research for their sole benefit at cost price provided this can be undertaken without detriment to the general programme ;
- (v) to receive confidentially, in convenient form, such results of researches as the Association decided not to publish openly ;

- (vi) to receive regularly the output of an information bureau devoted to the industry, and thus to be kept in touch with scientific and technical development at home and abroad ;
- (vii) to have their regular subscriptions recognised automatically by the Board of Inland Revenue as business costs and, therefore, not subject to income tax''.

Such co-operative research associations are what are necessary for Bengal. If several industries cannot have different co-operative research institutes, there should be at least one central institute to undertake the diverse departments of research works. If industries do not form themselves into voluntary organisations the Government should start a central research laboratory and extend all kinds of inducements and privileges to the incoming members.

The problem of finding suitable finance for any such research association or associations is most stupendous. To the British Associations the Government contributed in 1918 a large fund of a million sterling for the foundation and maintenance of approved Associations for research during the following five years. This aid was continued for a further period of five years. In Bengal, a similar start will be required to be given by the Government. Subsequently when the membership fees will fail to supply the needs of the Association without Government aid, a particular levy can be allocated for this purpose. Besides, certain shares of individual firms can be freely handed over to the Association and the Association itself may profitably sell the rights over any discovery. As the research association laboratory will be equipped with, besides the apparatus for original research, all the paraphernalia of a truly industrial laboratory, it may undertake from non-members at full charges and from members at concession rates, works of scientific analysis and examination. This will also be a source of regular income to the laboratory. The laboratory may as well receive students for training on small premia.

Whether there be a single central research laboratory or a

number of laboratories either maintained by different associations or by giant business, what is essentially necessary is proper co-ordination among them in so far as those researches are concerned over which no firm can have any cause to preserve secrecy. Our Central Record Bureau or Information Bureau, by whatever name it may be called, will serve the purpose in part. But so far as direction is concerned, a strong Advisory Council, composed of competent representatives of science and industry, will be necessary to direct researches so that there may not be any overlapping. The Advisory Council will also direct research according to the needs and necessities of the country. In a planned economic programme, the Advisory Council will be the brain and the Central Research Laboratory the hands for common achievements.

There is another, and nonetheless important adjunct of industrial research. Industrial research has its practical value so long as it works economically. Any discovery involving high cost cannot be of any service to the nation. Hence, a machinery is essentially necessary to bring all discoveries to the economic test. This test will certainly be estimated as a matter of course along with the very process of research. But when any discovery will be put to proper industrial use, a scientific cost account and other statistical observations will place it in proper economic perspective. Statistical study will also precede the research as well as follow it. Unless a proper calculation be made, preliminary to a problem being placed before a student for his scientific investigation, of the source of raw material, the cost which will involve in acquiring it for industrial use, the nature and volume of demand which will be expected on any finished commodity provided systematic industrial research finds out a way to its manufacture, and so on, there cannot be any sense in spending either energy or resources over a subject of industrial research. There must be a strong hypothesis in favour of it. All these problems will come under the statistical branch of the industrial research laboratory.

Statistical study will be essentially necessary for any plan designed for rapid industrialisation. How the plan is working,

and if it is achieving its ends, will have to be brought to statistical test at every step of its progress. How the existing industries stand and the new industries will stand in relation to similar industries in other parts of the world is no less an important subject of investigation than scientific investigation itself. Any planning cannot grope in the dark. It must know its way, its position and its surroundings. The statistical barometer will put the guiding brain on guard ; it will eliminate irregularity and uncertainty and make progress steady.

There now remains the problem of the choice of subjects of industrial research. Some of the subjects will surely arise along with the process of manufacture. Others will have to be secured and tackled. If old industries are to be given a new lease of life, industrial research should be directed to solve their present problem. If new industries are to be brought into existence, industrial research is to show the way. Our industrial research will be protective and productive. By pointing out the methods of scientific rationalisation industrial research will protect the industries and infuse new life into them. By showing the possibilities of new industries it will help to make the country highly industrialised. To achieve this double end industrial research will approach the subject from two angles. It will look to the economic resources of the country, the country's raw materials, and show how best they can cater for the needs and requirements of the factories and how best they can be brought to new industrial uses. It will also examine the country for local consumption and see how best the wares can be produced in our soil either with Indian raw materials or with materials imported.

The subject matter of industrial research may, therefore, be roughly brought under two main groups, neither of which can be said to be exhaustive nor entirely distinct—one from the other. Group A of our classification will include (1) Agricultural products of the country ; (2) hides and skins ; (3) mineral products ; (4) metallurgical ores ; and so on. Group B will include (1) Stationeries ; (2) Toilet requisites ; (3) Wearing apparels ; (4) Utensils ; (5) Luxury products ; and so on.

There already exist in our country many industries which exploit the sources of raw materials coming under Group A. Their technological and preparatory processes should be thoroughly analysed with a view to introducing technical improvements, economy of time and economy of cost. If new processes of manufacture are already employed in some other parts of the world they should be introduced into our country as far as they can be adapted to our own condition. At least the possibilities of their adoption should be thoroughly examined. If no improved process has yet been discovered anywhere in the world attempts should be made to find out prospects of improvements. Even if no factory exists to exploit our raw materials, one of the tasks of industrial research will be to find out new industrial uses of agricultural produce and other raw materials. Already Indian agriculture has to face competition on the world market as the result of agricultural policies of many countries in the New and the Old world. The salvation of the country's agriculture, therefore, lies in bringing new industries to its help.

In the matter of development of industries falling under group B, attention should first be given to the industries which already exist. Some of them are small and remnants of the old cottage industries which once flourished in pre-mechanical days. Others have been built up on modern scales with modern equipments of manufacture. Excepting very few none of them can boast of big dimensions in Bengal. Regarding the former category of this group, valuable results have already been obtained in the direction of suitable types of mechanical appliances to save drudgery of labour and to reduce the cost of production. As for instance, we may cite the improvements of the potter's wheel in the pottery industry of the Province, the hand-husking machine for developing the paddy husking industry in the villages, the conch-shell cutting machine for cutting rings from conch-shells, the jute spinning wheel for spinning jute yarn, the pot mills for grinding hard substances, and so on. Other types of improvements, for example, those in the new alloy for the brass and bell-metal industry, the

method of glazing for the pottery industry of the Province, have been successfully concluded by industrial research and are at present being introduced among the industrialists of Bengal. But still much remains to be done in building up a sound industrial structure for the Province.

But Bengal cannot confine her sole attention to the cottage industries. Every attempt should be made to bring the service of co-ordinated research to help the new industries on modern principles and also to modernise the cottage industries. For instance, experiments will have to be undertaken before long to reorganise the indigenous button industry of the Province, for which necessary raw materials such as horn, mother-of-pearl, nuts, tin, etc., are available. Similarly, although the hosiery industry has made tremendous strides within recent years, it is now suffering from the severe competition of foreign countries, particularly of Japan which is flooding the market with a bewildering variety of designs. It will devolve upon the industrial research department of the present plan to show how to cater for the fastidious tastes of a consuming public and also how to eliminate the difficulties that may stand in the way. By thus discovering new processes of manufacture, evolving new and artistic designs and reducing the cost of production, can the Province keep abreast of other progressive countries.

In the matter of framing an industrial research programme an important necessary step is to examine the import list of various commodities and find out what opportunities there exist in the country in the matter of raw materials, labour and other factors with a view to organising their manufacture. It is only when such materials are available it will be possible for us to draw up a comprehensive programme for industrial research for the benefit of the numerous industries that can be encouraged into existence. For the present, concentration on the following is imperatively urgent:—

(I) Ceramics for the manufacture of

- (a) Stoneware acid jars
- (b) Tea and table wares

- (c) Majolica ware articles
- (d) Earthenware
- (e) Porcelain insulators
- (f) Toys, etc.

(II) Glass for the manufacture of .

- (a) Chimneys of various kerosene and petrol lamps
- (b) Bangles
- (c) Glass plates
- (d) Glass panes (for windows)
- (e) Ink-pots
- (f) Tumblers
- (g) Jugs, etc.

(III) Enamel Industry for the manufacture of

- (a) Enamel wares specially hollow-wares
- (b) Name plates
- (c) Medical appliances, e.g., bed pans, etc.

(IV) Cutlery for the manufacture of

- (a) Scissors
- (b) Knives
- (c) Surgical instruments
- (d) Razors
- (e) Medical instruments, etc.

(V) Brass fittings to replace the imported articles

(VI) Pharmaceutical Industries, for developing new lines of manufacture

(VII) Leather goods, e.g., beltings, picking bands, etc.

(VIII) Textiles—cotton, silk, jute, etc.

(IX) Paper with special regard to the utilisation of local raw materials

(X) Paints and varnish with a view to developing processes utilising as much of the raw materials as are available locally and in the event of suitable raw materials not being available, to develop processes so as to utilise the raw materials that are available

(XI) Electrical goods, e.g., dry cell batteries, switches, electric fans, bulbs, etc.

(XII) Hardware, e.g., carpenter's tools, building material tools, hacksaw blades, etc.

(XIII) Celluloid articles

(XIV) Sporting goods

(XV) Photographic plates

...

(XVI) Soap—to develop processes to utilise our, available raw materials

(XVII) Miscellaneous articles.

CHAPTER XIX

TECHNICAL EDUCATION

The successful operation of any economic plan cannot be achieved unless a carefully thought out and well balanced scheme of education is initiated at the same time. Planned economy to be effective must include not simply economics proper but all that which makes for the production of wealth. The system of education prevailing in the country leaves much to be desired. In its foundation it is rickety, in its outlook it is faulty. To say the least it lacks balance. The system has to be thoroughly overhauled to suit modern conditions and the needs of the times in order that India may come into line with the prosperous countries of the East and the West. In any attempt to reorganise the present system of education we should take into consideration the supreme necessity of both primary and technical education in the country's programme for economic development. One must be the handmaid of the other. Illiteracy has always proved to be the greatest barrier to the realisation of various economic schemes in the country and the only solution lies in launching out a comprehensive plan of compulsory primary education on a basis which shall be within the reach of the humblest cottager in Bengal. The knowledge, however, of the three R's alone will not be sufficient. In an industrially backward country like India, a carefully planned scheme of technical education must be one of the most essential pre-requisites. For the attainment of rapid industrial development of the country we should confine ourselves to a study of technical education, as it should be, in this chapter leaving the consideration of the question of Primary Education to a later one.

If the importance of technical and technological education in an industrially backward country like India cannot be over-stated, it must also be admitted that the complexity of

the problem of such education cannot be ignored. Such education, to serve any useful purpose, must not be an exotic but should grow out of the actual requirements of the country and have its roots into the peculiar conditions of the communities to be served.

Even in a pre-eminently industrial country like England, where public opinion is forceful and powerful, the awakening as to the importance of technical education is not very much more than fifty years old. The awakening was almost sudden but when it came it roused the whole people to a consciousness of national responsibility and the country's possibility. For years English politicians and the English public could find for the word "education" no other meaning—as far as the mass of the people was concerned—than devotion of so many hours a week to instruction in reading, writing and arithmetic, with a few extras periodically thrown in for acquisition of experimental knowledge of physical geography, of insufficient acquaintance with all that helps to develop one's faculties, and scanty familiarity with facts and events of history. But it became increasingly apparent that the Germans were getting ahead of the British and were successfully competing them in their own markets because their workmen were better trained and consequently more efficient. The result was direction of attention to technical education. The agitation inaugurated by the late Mr. W. T. Stead when *Made in Germany* was published, at once drew public opinion to the need of the hour. Historically what arrested the attention of England was the triumph of Germany over France in the Titanic struggle of 1870, the date on which Germany was reborn with new ideas of education, the foundations of which were laid by Stein early in the century, in the Napoleonic era and picked up and continued by Bismarck. They were new ideas on which were founded new schemes which as if in the course of a dream brought primary and technical education within reach of all, so that, on the day when Metz fell it could be safely said that the German was a better educated soldier than the French and he knew the geography and the physical con-

ditions of France better than the patriotic brothers of Maclabon and Gambetta. Ever since Germany had been proceeding apace and had made strides in technical and industrial education—a part of the national life of the Fatherland. Be that as it may *Made in Germany* created a great furore in England and made the English people realise the importance of imparting technical education and of establishing technological institutes in the country. They had for their object the improvement of the existing industries of England so as to make them compete successfully with the industries of other countries and secondarily to develop other industries.

It was about this time that the attention of some people in India also was drawn to the needs of the country in the matter of such education. Perhaps the earliest evidence that we have of this is to be found in Mr. P. N. Bose's *Technical and Scientific Education in Bengal* published in 1886.

About forty years back two important papers were published on technical education in India, one by J. A. Baines and the other by Sir Mancherjee M. Bhowmagrae. The opening paragraph of Sir Mancherjee's paper quoted below is an interesting reading showing how alive he was to the importance of technical education in India :

“Of all the numerous subjects which a well-wisher of India is called upon to take into his serious consideration, there is none of such surpassing interest and importance as that of her industrial development, and as it is now a universally accepted principle that the growth of industries among a people is in proportion to their instruction in the sciences and arts applicable to their practical pursuit, the theme of technical education in India is one which I approach with much deliberation and with a certain feeling of anxiety.”

And it must be noted that a tocsin of alarm was also sounded at this time. Mr. Baines said at the outset :

“As regards India we are brought face to face with a state of society so different in many important directions from that with which we are here familiar that

at the risk of inflicting a platitude on our audience, we must ask them to bear in mind that technical, like general education, in order to fulfil its object to the utmost must be the outgrowth of the community which it is to benefit, and if imparted in the first instance from abroad, unless it be adapted to the soil and not impatient of the modifications imposed by local conditions, it must remain an exotic, watered and tended under abnormal circumstances, under alien auspices and influence, which the withdrawal of, would deprive it of its sole chance of existence."

This clearly shows the complex nature of the problem that confronts us in India where special conditions prevail. It cannot of course be said that these conditions, because they are different from those obtaining in Europe and America, are detrimental to the progress of technical education in India. On the other hand there are factors which are conducive to its progress. Prominent among these is the much-abused caste system. The caste system has been recognised by various people to have an importance of its own, an economic importance. Mr. Baines referred in his paper to the social and economic drawbacks of the caste system but was not oblivious of its advantages. "The very obstacles", he said, "which have been mentioned have in them the germs of a development which, under judicious treatment, may reasonably be hoped to give adequate results in the required direction. The domestic industries which occupy the attention of the great bulk of the artisan population foster a system of apprenticeship to a degree which in the West is now a faint recollection."

Speaking at a meeting of the East India Association (London) in 1907 Mr. M. S. Das who had done most useful work for the industrial awakening and progress of Orissa, said that, the caste system in which a particular industry was followed in each caste had the remarkable effect of producing physical adaptability among the workers. He added that in India the caste system had an industrial foundation.

The caste system, therefore, can be utilised as one of the

assets in evolving a useful system of technical and technological education in India. Thus the system of education in India cannot be a replica of an alien type. And special attention should be given to the peculiar conditions of the country and the provinces.

Past History

Though the claims of technical education had been advocated before, practically nothing was done before Lord Curzon's government gave it a vigorous stimulus. The results of an exhaustive enquiry conducted throughout India by a Committee of carefully selected officers were embodied in the Educational Resolution of 1904. In their report the members of the Committee laid particular stress upon the importance of industrial, commercial and craft schools as the preparatory stages of technical education for which, in its higher forms, provision had already been made in such institutions as the Engineering College at Shibpur (Calcutta), Rurki, Jubbulpore and Madras, the College of Science at Poona and the (Victoria Jubilee) Technical Institute of Bombay. Until then it had been "a record of inconstant purpose with breaks of unconcern."

The blame for this sad neglect of technical education in the past does not rest with the Government alone. The paramount necessity of such education is felt only when industrial development, demanding the application of applied science and improved methods, takes place. It was because of Bombay's industrial development that the need was keenly felt in that Presidency. A sum of over two lakhs of rupees had been collected to found a permanent memorial in honour of Lord Ripon, and this formed the nucleus of a fund with which the Victoria Jubilee Technical Institute of Bombay was established.

Since then, the Universities and the general public have become alive to the importance of technical and technological education and various institutions have been established to impart the kind of education needed for an industrially advancing province like Bombay. While the Tatas of Bombay placed

generous donations at the disposal of the Government for the purpose of founding an Indian Institute of Science, Sir Rashbehary Ghose and Sir Taraknath Palit placed large sums of money at the disposal of the University of Calcutta to advance the cause of scientific education and training, and the National Council of Education, Bengal had been established as a result of unstinted generosity of some of Bengal's most prominent landlords and businessmen as an independent institution which is now, after years of steady good work, recognised by the Government.

In this connection it would not be out of place to mention that technical education alone cannot solve the intricate problem of industrial development. The report of the Commercial Intelligence Committee of the Board of Trade in England which investigated trade conditions with a view to provide a basis for a comprehensive treatment of post-war problems revealed the fact that German potteries received Devon and Cornwall clays at three shillings a ton cheaper than the rate at which they transported the clays to British potteries. The Government of England was not slow to realise the exigencies of the situation. They resolved not only to come to the rescue of the industries but to offer them facilities for scientific research and for the transport of goods, etc. It will be appreciated that industrial development to be truly successful must have for its aid technical and technological education as much as scientific research and transport facilities. You cannot do with the one without the other. Each plays its part and a significant part too. It is, therefore, in the fitness of things that the two Universities of Bengal charged with the duty of imparting education should devise means to introduce a system of technical and technological education suited to the requirements of the people. In the matter of technical and technological education provinces should be as autonomous as possible and, therefore, some overlapping of costly technological courses may not only be found to be not avoidable but even necessary. Local conditions, local needs and local habits and tastes must exercise considerable influence in shaping local

policies. We have already referred to the Victoria Jubilee Technical Institute of Bombay in connection with which a definite step in advance has been taken of which we read the following in the *Times of India*:

"It is a legitimate source of pride, no less to the City and Presidency than to the University, that a post-graduate School of Chemical Technology has been organised in Bombay to train experts, who, given the opportunities, might put new life into the industries of Western India."

What Bombay is doing for the industries of Western India, Bengal ought to be able to do for those of this Presidency. The Calcutta University, thanks to the generosity of two generations of Bengalees, can now boast of a fully equipped Science College which has trained students who have acquired world-wide reputation. And it will certainly not be difficult for this foundation to open classes where the technological course may be undertaken. Similarly the University of Dacca should take early steps to impart post-graduate training in technology. If the two Universities will only act in concert with, for instance, the Department of Industries, it would be easy to give students practical training in some of the important industries which have a future in Bengal. It need hardly be said that in industrial training practical work occupies a more important position than the theoretical. The workshop must supplement the laboratory and the class-room. Admittedly the universities will require more money to place technical and technological education on a firm foundation. It is hoped that the Government of the Province will not be slow to provide the necessary funds.

Applied Science

That the industries of India have long been clamouring for the benefits of applied science we all know. Among them we will mention only a few—the treatment of oil seeds, the development of leather factories and tanneries, the production of vegetable and chemical dyes, the sugar industry and metal

work—all of which if properly directed would enable India to utilise her own raw materials with profit into finished products for home consumption, and for exportation abroad. "It is", as Sir Valentine Chirol put it, "equally important for India to save her home industries, and specially her hand weaving industry, the wholesale destruction of which under pressure of the Lancashire power loom has thrown so many poor people on the already overcrowded land." It was about this important industry that Sir Atul Chatterjee wisely remarked, "The hand industry has the greatest chance of revival when it adopts the methods of the power industry without actual resort to power machinery." That experiment can put new life into decaying industries has been amply demonstrated in the workshop of the Bengal Industries Department where improved methods of manufacture have been devised for old existing industries. The sooner the results of scientific research and experiment are made available to the small industries of the Province and the country the better, for, it is always difficult to revive such industries when the process of decline has gone too far to be arrested with success. The old stone masonry of England which produced the exquisite carving on the west front of the great cathedrals, the art of colouring glass, which was responsible for the soft and harmonious shades of illumination afforded by the great windows of the mediæval churches, the art of working in silver and pewter which made it possible for the poorest houses in England to possess their range of bright drinking vessels, the sister craft of wood-carving and moulding which made the furniture of the Jacobean and eighteenth century periods famous—these and many other arts and crafts, all of them practised in the humble village homes of the people, disappeared slowly throughout Europe, the process remaining almost unnoticed until people of taste began to remark that the old churches, the old glass, the old furniture were finer than anything which modern machinery can produce. It has been so in the case of many Indian industries. The glazed pottery and the ivory toys afford instances of such decay. That decay can be arrested. Let us give one instance—that of the conch-

shell industry. About twenty years back Mr. James Hornell, a Marine Assistant in the Department of Fisheries, Madras, prepared for the Government of Baroda an interesting brochure on the Indian conch-shell, the *Shankha* of Bengal. The art, for such it is, of cutting the *Shankha* bangles from the conch-shells is an ancient craft and valuable industry which may now be said to appertain solely to Bengal. Although the *Shankha* shell is indigenous nowhere on the shores of eastern India north of the Godavery, the whole of the work of reducing these shells to the form in which they are acceptable to Bengali and Indian ladies is carried out in this Province. At Dacca and in Calcutta the sawing of the shells into working sections gives employment to large numbers of skilled artisans who still use as their chief tools heavy double-handled saws and small hand-saws, exactly similar to those which have been used for this purpose for at least 1,500 years. The actual carving of the sections or rings also gives employment to hundreds of workers. Shells valued by the importers at some two to two and a half lakhs of rupees per annum are brought in from the ports of Southern Madras and Kathiawar. By the time they are ultimately placed on the market the products of these shells—chiefly *Shankha* bangles—are worth over fifteen lakhs of rupees. Such is the importance of the industry which was languishing and which, through perhaps sheer accident, may again assume proportions by no means negligible. Mr. Hornell suggested that the people of Okhamandal on the Kathiawar coast where the shells are collected might well be taught to do with modern machinery what the Bengalee craftsman does with his old-fashioned saws; namely, manufacture the beautiful *Shankha* bangles and export it instead of the raw material in the shape of the natural shells. The machinery which Mr. Hornell thought of has been improvised by the Bengal Industries Department, making the work of preparing the rings easy. Details of this machinery are to be had from the Department. The capital necessary to start the industry with this machinery is Rs. 500 to Rs. 600, the period of training being approximately 6 months and the expected monthly return Rs. 115 to

Rs. 125. The Brass and Bell-metal industry is also capable of improvement. A new alloy has been produced as the result of a series of experiments conducted in the workshop of the Department which makes the articles cheaper and a process has also been discovered which removes the brittleness of the articles treated. These innovations are sure to do for the two industries mentioned above what the introduction of the fly-shuttle loom has done for handloom weaving.

Needless to say that these industries are small industries—call them cottage industries, if you like,—which can be pursued in the villages obviating the necessity of the workers leaving their hearths and homes and congregating in large numbers in the towns. These small industries are no less important in the economic organisation of the Province than large industries requiring huge capital and employing large armies of labourers. As long as the owners of many little plants are content to do a small and limited business, they can earn a living, but as soon as they seek to enter the general market they are hopelessly under-sold. This is mainly because buying and selling, transportation and subsidiary work cost the big producer far less per unit than they cost the small one. The results of experiments carefully conducted in the workshops and laboratories when judiciously applied and utilised work wonders for the small industries, which are scattered all over the country affording employment to thousands of people. This has been witnessed in modern Japan where the old cottage industries have successfully maintained themselves in spite of the fact that large mills and factories have been and are being established.

Speaking for Bengal we can confidently say that the Department of Industries has demonstrated that there are various small industries, not requiring a large capital nor elaborate machinery, in which intelligent youths can easily engage themselves.

The industries mentioned above have been more or less completely investigated, their economics fully studied, and new processes of their manufacture evolved and standardised. For each youngman set up in any of these productive industries

more men will be necessary to take up the distribution of the products of the factories.

The Indian Industrial Commission (1916-18) referred thus to the small industries :

"A general review of the evidence tendered to us, supplemented by numerous inspections in the towns and villages that we have visited, confirms us in the conclusion that cottage industries are a very important feature in the industrial life of India ; that they are by no means so primitive as they are usually depicted ; and that there is no real ground for belief that they are generally in a decadent condition. We have been unable to obtain accurate statistics regarding the actual number of workers in the various cottage industries, but in every town they still form a large percentage of the population, and they are to be found in almost every village, so that their numbers are still vastly larger than those of the operatives employed in organised industries."

The Commission held that industrial schools in India should devote themselves solely to train indigenous artisans for small industries.

Research and experiment must be continued to introduce improvements in the small industries with a view to enable them to maintain themselves. The inexhaustible supply of cheap labour which Sir Alfred Chatterton has characterised as "India's greatest asset" can be most profitably utilised in the small industries.

The Factory System

But along with innovations in the cottage industries must come the factory system of the West. That is inevitable, and we are witnessing in India a growing desire to introduce and adopt this system with its concentration of labourers and mass production. Here the lessons of Germany would be found useful—

"While England was leading the world in industrial and commercial enterprises Germany was lying dormant,

unfavoured in position, with a naturally poor soil, surrounded by enemies and with a very conservative population chiefly agricultural. Long after England had passed through the first and most violent stages of industrial revolution and the other countries of Western Europe were in the midst of great changes, Germany awoke from her lethargy and slowly began, under the stern force of necessity, to develop her industries and to give less relative attention to agriculture and more to manufacturing, transportation and commerce."

In one respect Germany's slowness of development was an advantage as that terrible waste of human life and health which accompanied the industrial revolution in England was almost unknown in Germany and could be easily avoided. Very slowly did Germany, borrowing the tools and ideas of her rivals, or learning them by stealth, develop modern factory industries. Yet the lack of national unity proved a great drawback ; and not until the Tariff Union (Zollverein) was formed in 1818 as a commercial federation of German States for the maintenance of uniform duties and tariffs as against foreign countries could Germany make substantial progress. It was made co-extensive with the German Empire upon its foundation in 1870. It then came to be rechristened as the Imperial Zollverein. By it were the first barriers of that unity broken down. The German nation was now on the fateful days of 1870 able to stand forth united in their outlook as in their activities, political, educational and commercial.

"Since then German industries, fostered by a strong and paternalistic Government, aided by the best that science can bring and by a fine system of industrial education conducted by a people hardy, diligent, faithful, subservient to discipline and inspired by public spirit, have grown in size and strength till Germany is to-day one of the leading manufacturing and exporting nations of the world."

Yet even now the industries of Germany are classified

under two main heads—the factories (or large industries) and handwork (or little industries)

“This division into handwork and factory industries is profoundly important in all industrial questions in Germany. The country has been and remains slow in substituting modern factory types of industry for the older and more simply organised handwork. Not that factories as large as any do not exist in Germany but the proportion of workers busied in them is probably less than in the United States.”

If it is so important in the case of Germany it must be more important in the case of India. And the question of providing occupation for the teeming millions of this country cannot be overlooked. Even in England the motto of the British trade unionist is “Make the work go round and let as many men as possible have a share of it.” But this had no parallel in the United States, where they say, “Get the work as far as possible to do itself” or, as the Americans themselves express it, “We work hard finding out how to avoid work.” Economy of muscular effort is the keynote of American industry in all its branches. Conditions in India must be different. These are primary considerations which cannot be ignored in evolving a system of technical and technological education suited to our requirements. Nor should we, in our eagerness for economic development on Western lines, put the cart before the horse, *i.e.*, educate our youngmen in the industries before there are industries which can profitably employ or, in other words, absorb them. For years now an Association in Calcutta has been stimulating our youngmen with scholarships to go to foreign countries to acquire proficiency in and get initiated into the mysteries of industries non-existent in India but possible of development. But it is not an uncommon sight to find many of these young men,—perhaps fully qualified,—failing to get opportunities to utilise their training in factories and mills. This was also the case with the old time scholars whom the Government sent to England to study agriculture. On their return they could not utilise their acquired knowledge of agri-

culture and many of them therefore had to be provided with appointments in the Bengal Provincial Civil Service. Very few of them even joined the Agricultural Department of the Government of Bengal. Thus the training which they had received in England ran to waste.

The object of imparting technical and technological training should be twofold, (1) to supply trained men to the industries and (2) to train up young men with a view to provide them with work. If young men trained for special industries find no opening in the country for the utilisation of their training it is absolutely useless to spend money on a system of technical and technological education. Money spent on brick and mortar, on fittings and furniture, on laboratories and teachers should yield return in providing students with occupation and the industries with trained men. Training Schools in England, Germany and America have arisen out of the necessity created by the industries. Thus the system of industrial Schools in Germany, so far as that is made up by Compulsory Improvement Schools, is, in a sense, but a part of the apprentice system, though, compulsory attendance in these schools applies also to unskilled youthful workers as well as to apprentices. Hour for hour the Industrial Schools probably leave a deeper impression on the apprentices and other students attending them than do the shops.

The Industrial Schools of Germany, again, may be classified as follows :—

- (1) General Trade Schools,
- (2) Special Trade Schools,
- (3) Engineering and Scientific Schools.

The General Trade Schools embrace (a) the Industrial Continuation Schools or part-time schools for young people between the ages of 14 and 17 or 15 and 18 who have finished their general education in common schools and are employed in the industries as apprentices, helpers and other manual workers ; (b) the Mechanics' Schools with Sunday morning and week day evening classes for the technical and theoretical

instruction of journeymen and (c) the Industrial Art Schools for the better education of artisans and mechanics in the theory, art and technique of their respective crafts.

The Special Trade Schools provide specialised technical and manual training in particular trades aiming to take place of ordinary apprenticeship in whole or in part by preparing the learner for the pursuit of the trade as master journeyman or skilled apprentice. In Germany they are generally understood to include such institutions, as :

- Textile Schools,
- Special Schools for the metal industry,
- School for builders,
- School for wood-workers,
- School for tanners,
- School for clock-makers,
- School for opticians,
- School for potters,
- School for coppersmiths,
- School for book-binders,
- School for plumbers,
- School for dyers, etc., etc.

Each of the Engineering and Scientific Schools makes a speciality of the following technical professions :

- Civil,
- Mechanical,
- Electrical, etc., etc.

It is a significant fact that in Germany, England and America in order to keep in close practical touch with the actual industries for whose operation the young people are trained the Schools are usually found in the same localities where the related industries flourish ; the relationship between the Schools and the industries being thus one of reciprocity. Special schools exist in Germany for almost every trade known to the industrial world. But the Germans do not believe in the plan of teaching trades wholly in the schools except when the conditions of a particular industry are such that the

necessary training of the learners cannot be provided. This is particularly the case in the textile industry where the necessity for special technical knowledge and the acquisition of high skill in handwork as well as in the operation of the complicated machinery of trade led to the establishment of special schools for weaving, spinning, etc. Even in many of these schools a requirement for admission is *previous practical employment in a textile factory*.

In arranging the programme of instruction in the industrial and mechanical schools, the tendency is specially to enlarge and cultivate the trade classes which are more closely related to the distinctive industries of particular localities.

Thus it is evident that in England, Germany and America special schools are started for the industries, so that the industries can get really efficient men.

The co-ordination between the industries and the schools proves that these educational institutions become necessary for the industries and lose their importance and utility when divorced from the industries, for, it is in the factories only that practical training can be obtained.

The lesson of the experience obtained in highly industrialised countries in the West should not be lost on us.

The growth of industries in India demands that special training facilities should be afforded to young men who will be recruited by them. But at the same time training institutions should be founded only with an eye to help the industries with skilled men and not for any other purpose.

This is a fact which we must keep before us.

Suggestions

The number of large industrial establishments in India is on the increase. The jute mills on the banks of the Hooghly, the Cotton Mills in various provinces, the foundries, etc., are

growing in number. The number of these establishments was as follows in 1929 :

Textiles	...	...	...	759,416
Engineering	...	...	...	267,126
Minerals and Metals	...	...	...	60,246
Food, Drink and Tobacco	...	...	...	189,296
Chemicals, Dyes, etc.	...	...	...	56,126
Paper and Printing	...	...	...	44,741
Processes relating to wood, stone and glass	...	...	...	41,347
Gins and Presses	...	...	...	176,316
Miscellaneous	...	...	...	35,564

Thus in 1929 there were as many as 1,542,173 establishments which must be recognised as large.

In Bengal there were 124 textile establishments employing 356,333 workers. Fiscal autonomy granted to India has resulted in imparting an impetus to various industries and to-day more cotton mills and sugar mills are being started on a joint-stock basis.

Considering these we would suggest that attention be given to impart education for the following industries in Bengal :

- (1) Jute
- (2) Tea
- (3) Sugar
- (4) Paint and Varnish
- (5) Soap
- (6) Chemicals
- (7) Oil
- (8) Metallurgy
- (9) Pottery
- (10) Cotton, etc.
- (11) Leather
- (12) Electricity
- (13) Pharmaceutical industries
- (14) Glass
- (15) Mining.

Jute is the principal money crop of Bengal, and 90 jute mills in the Presidency give employment to 339,665 persons. Tea gardens also employ many hands. The sugar mills that are now in course of construction must require many workers. The paint and varnish industry is more extensive in Bengal than in any other Province of India. The manufacture of soap is an ancient industry, and thanks to the endeavours of the Bengal Industries Department, it, together with several other industries, is growing in importance.

Bengal possessed in 1929 as many as 6 chemical works employing 2,159 men, while the number of oil mills in the Presidency was 55.

As these industries have taken root in Bengal and are capable of expansion it would be advisable to train young men up for these. Reference has already been made to the futility of awarding scholarships indiscriminately. Let us quote the following from the Special Report on Technical and Industrial Instruction in Bengal (1888-1908).

“Proposal for the institution of State technical scholarships was one of the results of the Simla Educational Conference of 1901. It was proposed that selected candidates should be sent abroad to undertake definite courses of studies in subjects connected with industrial science and research, and that an allowance of one hundred pounds a year in addition to travelling expenses and fees should be granted for two years on an average. The Government of India proposed that two such scholarships should be allotted to Bengal. Local Governments were to be asked to consider what industries were of importance and which should be best encouraged by scholarships, particularly such industries as were susceptible of being organised upon a considerable scale. The principles of the scheme met with the approval of the Secretary of State, and the proposed amount of the scholarship was subsequently fixed at one hundred and fifty pounds a year. It was suggested to the Government of Bengal that the mining industry would find a

favourable field for the initiation of the experiment. The scheme was put in force in 1904, and eleven State Scholars in Mining Engineering were selected in that year and in the three subsequent years and sent to Birmingham in England."

But only one out of the three was able to secure employment in his own line after return.

Later in the rules for selection it had to be laid down that the Government would be guided by considerations of the capacity and intelligence of the applicants and of the practical interest shown by them in the industries selected, as also of the assurance that they would continue to devote themselves to the industries on their return to India. It was also made a condition that before being nominated the scholar should have received the best technical education available in the province in the particular industry which he proposed to study.

The Report gave a long list of subjects—ranging from electrical engineering to umbrella making—for the study of which the Association for the Advancement of Scientific and Industrial Education of Indians had sent abroad 82 scholars. But unfortunately several of these students could not secure industrial employment on their return.

As Mr. Cumming remarked in the Report, "It is essential that stipend-holders should obtain genuine industrial employment on their return, each in his own special subject."

The industries mentioned by us would be able to absorb many trained students and be profited by them.

There is yet another point to which attention should be drawn. We have mentioned that there are a large number of big industrial establishments in Bengal—the jute mills, the cotton mills, the paint and varnish factories, the chemical works, etc. Besides these there are several docks and engineering works. Some of these works take in apprentices under arrangement made by a body appointed for the purpose. In discussing the English, German and American systems we have seen what importance attaches to the training of apprentices. The purpose

of apprenticeship in Germany is primarily the efficient training of the apprentice and this is regarded as of the utmost importance to his individual well-being in his trade and of the greatest civic importance, for, the efficiency and general development of whole social classes of citizens depend largely or chiefly on the proper training of apprentices. The larger part of the training of the great majority still takes place *not in the school but in the workshop.*

There is no reason why the industrial establishments should not be persuaded to adopt the apprentice system evolved by a competent Board on which representatives of various industries, conversant with their peculiar conditions should serve as advisers. It will merely be an extension of the prevailing system and would be as much useful to the people as to the industries. One of the many surprising things said about American industry is that the American workman, though the most highly paid of any in the world, turns out to be the cheapest labour. This is because in America the workman is properly trained. The American labourer is a creature of infinite variety. He is of all races and tongues. Even the Chinaman, the Japanese, the Armenian and the Arab can be found there. From this chaos of raw material American industry draws its labour. By a process of education, in which machinery plays an important part, the ignorant Scandinavian or Hungarian or Chinese or Arab is transformed into a more or less skilled labourer, sometimes of high efficiency. As he becomes Americanised he grows brighter, begins to use his faculties, to save his hands and ultimately he falls in love with the inevitable labour-saving machine. In Bengal intelligent and educated young men are ready to take to industrial life. In the latest Census Report there is an interesting paragraph on the signs of a change in the attitude of Bengalees towards manual labour. A not inconsiderable proportion of workers in industries is now being drawn from *Bhadralok* classes to whom until recently the idea of manual labour would never have occurred, nor appealed if occurred. This has been fully demonstrated by the eagerness

with which *Bhadralok* young men have taken to small industries in which training is given by the Department of Industries. The sight of young men using the hammer and trimming the fire with evident zeal is a pleasing one. When intelligent young men can be had as apprentices why should not necessary arrangements be made for them to learn the work as apprentices?

The technological classes should have the workshops and factories to give the learner practical training. There are the Government Engineering College, the School of Engineering in Dacca, the workshops of the Industries Department, the Science College, the Government Tannery and the Railway Workshops, and the Workshops of the Commissioners for the Port of Calcutta and of the Calcutta Corporation. If to these can be added the Jute Mills, the Cotton Mills, the Sugar Mills, the Paint and Varnish Works, the Soap Factories, the Chemical Works and the Oil Mills there would be no dearth of opening for learners in the theoretical as well as the practical field.

The two Universities of Calcutta and Dacca can organise technological classes for theoretical training and make arrangements for practical training in the mills and factories through a Board or through the Department of Industries. The lure of the parchment paper is very great to the average Bengali student. Law hitherto has been regarded as the most lucrative "industry" in Bengal. It is no longer so, because people have learnt to count the blanks in the gamble and not look only to the prizes. A large number of students could be attracted to these technological classes if the Universities were to inaugurate a system of awarding degrees and diplomas in the various technical subjects such as ceramics, metallurgy, etc. The University of Benares has already adopted such a system and there is no reason why Calcutta and Dacca should not emulate the example of Benares.

Every province has its special industries while some industries are common to all the provinces. Under the circumstances every University must evolve its own system of

technological education, regard being had to the special facilities it can command. Unnecessary eagerness to avoid duplication may end in stultifying work, for students from one province have always found it difficult to get recognition in the Universities of the other provinces.

The Calcutta University has well-equipped laboratories which can be used for technological training purposes while the mills and factories can easily be made use of. Already one University is feeling chary to recognise the degree of another while some are fostering extreme exclusiveness by bolting their doors against students from other provinces. Under the circumstances the Bengal Universities would do well not to allot the usual number of seats for learners from other provinces till the requirements of Bengal are fully satisfied.

The supreme need of the hour is industrial development, which can only be accomplished by harnessing science to the service of man. In this matter Bengal has a considerable leeway to make up. In regard to higher technical or technological education progress during the last fifty years has been insignificant. A Technical Institute is as much a desideratum to-day as it was fifty years ago. Some so-called technical schools have been established during the period, but the teaching imparted in them is almost exclusively confined to surveying, carpentry and smithy work, and is not calculated to enable the alumni to take any part in the development of the resources of their country. The Calcutta University, the premier University in India, charged only with advancement of learning in the Province and outside it, had long neglected instruction calculated to lead to industrial development. Now that signs are visible indicating that it has warmed to a sense of its responsibility let it discharge its duties earnestly and well. The sister University of Dacca should also recognise the urgent necessity of imparting technical instruction and take immediate steps accordingly. Let the two Universities of Bengal work hand in hand in this direction so that the future of Bengal may be flashed with the radiance of a new dawn ushering in a glorious day.

While the University can arrange for higher technological instruction the more important work before the Province is to bring home to workers the benefits—direct and indirect—of technical education which should be palpable and immediate. In this direction the Department of Industries, Bengal, can render very useful service. The modest Local Trading Schools should be the last link in a chain of educational institutions. The first link in a chain must be the Central Institute located in Calcutta, and acting as the fountain-head of research, investigation, information, organisation and propaganda. From it should emanate all information, advice and policy. It should have a laboratory and a museum attached to it as integral parts. In the laboratory should be conducted researches and experiments for the improvement of existing industrial processes and the introduction of new methods. In the museum should be collected samples of finished products of the industries from other provinces and countries, articles which Bengal imports for the use of her people and similar articles produced in the Province. Every imported article should be carefully examined from the point of view of the raw materials and the facilities Bengal affords for its production. The demand figures should be studied and the possibilities of expansion explored. The cost should be ascertained and the special conditions in the producing centres of Bengal considered. All this should be done with a view to see if the production would be a paying proposition.

As soon as the paying nature of the industry is established necessary information should be transmitted to the District Trading School for transmission to the Sub-divisional Organisation.

In establishing District Schools care should be taken to study local conditions before the work is undertaken. It would be sheer waste of time, energy, and money to establish a District Trading School for silk in a District where the silk industry is non-existent and where the conditions are not congenial to its introduction.

The District Schools in their turn would transmit the

information, etc. to the Sub-divisional Schools,—these schools to be established only in the Sub-divisions where the industry exists. These Sub-divisional Schools would not only undertake the dissemination of information but should also organise demonstration in centres of the industry.

To give two concrete instances :

(1) The Bengal Tanning Institute at Calcutta can properly function as the Central Organisation for the leather industry, conducting as it does, researches not only in tanning but also in the industries which use leather as raw material, i.e. making of boots, shoes, slippers, sandals, suitcases, attaché-cases, purses, etc. It should have a museum ; and the laboratory and training classes that are attached to it should be enlarged. The results of its researches, investigations, and experiments should be transmitted to the District Schools. It appears from the *Report on the Survey of the Cottage Industries in Bengal* that in the Burdwan Division the industry exists in the following districts :—

- (a) Burdwan
- (b) Birbhum
- (c) Bankura
- (d) Howrah

The District Schools in these four districts should undertake to control the Sub-divisional Schools under them, and they in their turn should take charge of work in the village or town centres, giving the actual workers necessary information about leather-market, etc., supplying them with improved patterns and demonstrating the usefulness of new appliances and machinery.

(2) The Weaving Institute at Serampore which is being reorganised should be renamed the Provincial Textile Institute and should have a museum and a laboratory attached to it. It should organise the districts, the sub-divisions and the actual industrial centres on the lines indicated in the case of the leather and leather-goods industries.

After a time, say a year, it might be possible to organise co-operative societies for the workers. Similar technological

institutes should be started for soap, metallurgical industries, ceramics, etc.

In Bengal we have our peculiar conditions and peculiar advantages appertaining to them. The caste system, as we have said before, offers special facilities. Those in the industry should be the first to receive attention and should not be given to think that others are cutting into their profession while others will have to be trained in the improved methods.

We have shown how in Germany, England and America, in order to keep in close practical touch with the actual industries, the Schools are usually found in the localities where the related industries flourish. This is all the more necessary, for it not only keeps the Schools supplied with students who had obtained previous practical knowledge of the industries and can, therefore, easily grasp the opportunities offered but who can also feed the industries.

A scheme, such as is outlined in the foregoing pages, may well be expected to work successfully and lead to the development of industries, a much desired consummation in Bengal.

CHAPTER XX

PRIMARY EDUCATION

If there is one thing more necessary for developing the resources of Bengal than another it is Primary Education, the education in which every child, boy or girl, in the Province may participate. The amount of ignorance in the Province is appalling. In a statement given in the latest Census Report "Numbers literate per 1,000 of the same sex aged 5 and over" we find the following deplorable conditions prevailing in Bengal to-day :

All religion		Muslims		Hindus	
Male	Female	Male	Female	Male	Female
181	33	116	18	260	50

In Calcutta itself, the capital of the Presidency and the chief centre of learning the figures show that only 479 males and 338 females per 1,000 are literate while in Malda the figures are 69 and 7 respectively.

When the vast majority of the people are steeped in ignorance every attempt at the introduction of improved methods of agriculture and industries would prove futile. A hundred years ago (20th January, 1835) Lord William Bentinck, Governor-General of India, wrote in a Minute :

"As it now seems an universally admitted axiom that education and the knowledge to be imparted by it can alone effect the moral regeneration of India, nothing need be said in support of this principle."

Mr. D. Adam, who was appointed to investigate the state of education in Bengal in 1835, wrote as follows :

"It is assumed that Government is desirous of encouraging education amongst all classes of its subjects, whether Christian, Mahomedan or Hindu as a means of improving their condition by a better knowledge of the arts of life that minister to human wants ; of

purifying and elevating their character by moral and intellectual instruction ; and of qualifying them at once to appreciate the benevolent intentions and salutary measures of Government, and to give to those measures the moral force derived from the support of an intelligent and instructed population. Without this moral force, which education only can create, Government, however benevolently administered, is but the will of the strongest which finds no response where physical power does not reach, and legislation, however wisely devised, is but a dead letter, which reposes in the statute book, is barely enforced in the Courts, and out of them is inert and unknown."

The attempts made during a hundred years, however, have not succeeded in making Primary Education free and compulsory, conditions which must be had recourse to if the benefits of it were to reach the doors of the humblest cottager in Bengal. Proposals made by Indian members of the Legislative Council in this matter had to be turned down by Government on various grounds. It has not yet been found possible, owing to paucity of funds, to give effect to the Primary Education Act passed by the Bengal Legislative Council as a result of the endeavours of, among others, Sir Khwaja Nazimuddin, K.C.I.E. Fat maggots and creeping parasites of suspicion and superstition breed in the warm comfort of ignorance, and where ignorance prevails it is difficult to introduce necessary innovations. How to bring the results of research to the notice of the cultivator or the worker engaged in a cottage industry who cannot read? How to make him realise the possibilities of development in his occupation? How to explain to him the immense advantages of the co-operative system? These and other problems cannot be solved till education filters down to the masses who are the back-bone—the mainstay of the nation.

In the history of mankind there are many defeats which must be considered more glorious than victories. The defeat of Mr. G. K. Gokhale, a non-official Indian member of the Imperial Legislative Council, in 1910 to get the resolution

recommending that "a beginning should be made in the direction of making elementary education free and compulsory throughout the country" was one of such defeats. On the occasion of the debate on his resolution Mr. Gokhale said :

"It is at present universally recognised that a certain minimum of general instruction is an obligation which society owes to all its future members, and in nearly the whole civilised world every State is trying to meet their obligation only in one way, namely, by making elementary education compulsory and free. And thus it is, that led by the German State, country after country in Europe and America and Japan in the East have adopted this system of free and compulsory education."

The reference to Japan was, we think, specially opportune. The whole system of education in Japan was brought under the direct control of the Education Department of the Government established in 1871. The Mikado's edict, issued next year, as to the aims of the educational system, rendered freely in English was as follows :

"All knowledge, from that essential for ordinary requirements, to the higher accomplishments necessary to prepare officers, landowners, merchants, artists, physicians, etc., for their respective callings, is acquired by learning. It is intended that henceforth education should be so diffused that there may not be a village with an ignorant family, nor a family with an ignorant member."

It was an ambitious programme no doubt ; but the Japanese have never lost sight of the ideal. In fact they have systematically striven to achieve that ideal. The result is that while before 1872 the total proportion of the population of Japan that was at school was only about 28 per cent. by the time that the nineteenth century closed it had already risen to over 90 per cent. And this was achieved by Japan simultaneously with the creation and organisation of her magnificent army and navy. What is to be admired most in

the Japanese system is that in Japan, before 1890, they had relied more upon moral persuasion than upon compulsion. As we are concerned here more with elementary than with higher education we give below the official description of the Japanese elementary tuition :

Elementary schools are designed to give children the rudiments of moral education and of education especially adapted to make of them good members of the community, together with such general knowledge and skill as are necessary for practical life, due attention being paid to their bodily development.

The elementary schools are divided into ordinary elementary schools and higher elementary schools. Those established and maintained at the expense of cities, towns or villages or of town and village unions or of districts within them, are called city, town or village elementary schools, and those established and maintained at the expense of one or more private individuals are called private elementary schools. An ordinary elementary school course and a higher elementary school course may be established conjointly in one and the same school. In a higher elementary school, one or more special courses in agriculture, commerce or industry may be established, and a supplementary course may also be established in ordinary or higher elementary schools. The ordinary elementary school course extends over three or four years, and the higher elementary school course over two, three or four years. The supplementary course extends over not more than three years, while in regard to the special course the length of study is not yet fixed.

The story of how the new system has brought about a revolution in education is surprising. Stafford Ramsom in his book *Japan in Transition* refers to various conflicting facts which go to shake one's faith in the virtues of accepted theories and says :

"I can only come to the conclusion that, as far as the masses are concerned, education makes more effectual progress in some of the quiet and outlying districts

which are practically undisturbed by the foreigner, or by modern methods, where the old native industries flourish steadily and uninterruptedly ; where the Japan of to-day is still to a certain extent the Japan of the past, and where the only modernising influence which is now making itself felt is occasioned by the Government regulations on a good elementary education of a nature hitherto unknown."

But in these respects, in connection with the propagation of elementary education, Russia has taken a bigger step in advance. There all education in the elementary and middle schools, excepting for children of high-salaried engineers and other specialists, is free and in the technical schools, the universities, and the various institutes, about three-fifths of the students are not only taught free but receive monthly stipends to cover living expenses. Only if they fail in their studies, all the stipends are withdrawn from them. It is now the rule, an inflexible rule, that every elementary or secondary school should have a dining room which provides, at least during a part of the year, one hot meal a day to the students. In the villages the meal is free. In the cities it is free for children for the lower-paid workers and officials ; others pay from 12 to 25 copecks, that is from about three pence to nine pence a meal.

In Bengal the people have never undervalued the importance of an agricultural and industrial training. When Lord Stanley's despatch of 1859 led to enquiries into Vernacular Education on the part of the Bengal Government, opinions were received from various people. We give below extracts from the statements of two prominent Bengalees of the time :

(i) Raja Sir Radhakanta Deb Bahadur stated : "As soon as the people will begin to reap the fruits of a solid vernacular education, agricultural and industrial schools may be established in order to qualify the enlightened masses to become useful members of the society. Nothing must be guarded against more carefully than the insensible introduction of a system whereby with a smattering knowledge of English,

youths are weaned from the plough, the axe and the loom to render them ambitious only for the clerkship for which hosts would besiege the Government and mercantile offices, and the majority being disappointed (as they must be) would (with their little knowledge inspiring pride) be unable to return to their trade, and would necessarily turn vagabonds”.

(ii) Wrote Babu Peary Chand Mitter, “I would suggest that if arrangements can be made for instructing the pupils of village schools in practical agriculture and horticulture, it will not only conduce to the improvement of the material condition of the people, but serve substantially the cause of popular education which the Government is so anxious to promote. What the village school pupils should learn must be practical and not from books”.

The Rev. K. M. Banerjee explained how education would help the raiyat.

The end of national education is not to create a large community of clerks, but to fit all classes for their natural work. That this was fully recognised in Bengal more than seventy years back would become apparent from the observations of Raja Sir Radhakanta Deb Bahadur and Babu Peary Chand Mitter quoted above.

It is interesting to note that the ideal of national education has found favour with our ladies and institutions like the Saroj Nalini Association and the Narisiksha Samity are training our women for works for which they have a natural aptitude. The former has made remarkable strides within a very short period of its existence. Thanks to the indefatigable energy of Mr. G. S. Dutt, I.C.S., the founder of this great and noble institution, it is making its influence gradually felt in every nook and corner of Bengal. The movement for improving the women and motherhood of Bengal will go a long way towards revitalising the Bengalees and Bengal can justly feel proud of the founder of the movement whose selfless and pioneer work has ultimately succeeded in creating a national awakening in this direction.

Our British administrators have not been slow to recognise their obligation. The Court of Directors, in their despatch of 1854 first of all made the following declaration :

"It is one of our most sacred duties to be the means, as far as in us lies, of conferring upon natives of India those vast moral and material blessings which flow from the general diffusion of useful knowledge and which India may under Providence derive from her connection with England."

In it is to be found the earliest expression of the determination on the part of the Government to accept the education of the entire people of India as a State duty.

The Despatch went on further to say :

"Our attention should now be directed to a consideration if possible still more important and one which has hitherto, we are bound to admit, been too much neglected, namely, how useful and practical knowledge suited to every station in life, should be best conveyed to the great mass of the people who are utterly incapable of obtaining any education worthy of the name by their own unaided effort : and we desire to see the active measures of Government more specially directed for the future to this object for the attainment of which we are ready to sanction a considerable increase in expenditure".

Mr. Bhupendra Nath Basu was, thus, fully justified when in 1910, speaking in the Legislative Council, he said, "If it is found necessary in England that primary education should be made free, I respectfully submit that the case is much stronger for us, the people of India, who have been described by the Finance Member as well as the Home Member to be extremely poor, and especially for the class who will come under the purview of the extension of the system of primary education".

The question of education of the masses naturally engaged the attention of the Commission of 1882. The enquiries instituted by the Commission resulted in the discovery that only 1.2 per cent. of the whole population of India at that time received primary education. The Commission pointed out

what a vast area had to be covered, made several recommendations—two of which are quoted below :

(1) "While every branch of education might justly claim the fostering care of the State, it is desirable in the present circumstances of the country to declare the elementary education of the masses, its provision, extension and improvement, to be that part of the educational system to which the strenuous efforts of the State should now be directed in still larger measure than heretofore".

(2) "An attempt be made to secure the fullest possible provision for an expansion of primary education by legislation to the circumstances of each province".

The claims of primary education were thus fully recognised. But adverse circumstances have combined to retard the progress of elementary education in India. An examination after twenty five years from the date of the Commission showed that in course of a quarter of a century the progress of primary education in the country was represented by an advance from 1.2 per cent. to 1.9 per cent. of the total population. An extremely poor advance, to say the least of it.

Since then attempts have been made to accelerate the rate of progress. We have already referred to the Bengal Rural Primary Education Act. To-day we have in Bengal 60,336 Primary Schools which are attended by 2,200,819 students.

But unless the rate of progress is made more rapid by making primary education free and compulsory, it will not be possible to make all round progress in the Province an accomplished fact.

While on this point we are tempted to bring under consideration the remarkable results achieved in Soviet Russia on a planned basis of education. Those who are familiar with Rabindra Nath Tagore's "Letters from Russia", and other works on the Russian movement, whose number is a legion, particularly the works of Maurice Hindus—himself a Russian by birth and education and now settled and naturalised in America—will agree that the whole external appearance and

inner outlook of education in that country has changed in a short period so as to make it of essentially practical value. We have it on unimpeachable authority that in 1915 there were slightly more than 7,000,000 pupils in the Russian elementary schools, and slightly over 500,000 in the secondary schools which were all of high standing academically save those which were parochial in situation. In 1932, i.e., in the course of 17 years after the five year plan had begun there were 19,000,000 pupils in the Russian elementary schools and 4,550,000 in the secondary schools. In 1915 there were not more than 125,000 students in the Russian universities and 267,000 in the trade and technical schools while in 1932 there were 500,000 of the former and 850,000 in the technical schools alone and no less than 1,100,000 in the factory schools. In 1920 sixty-eight per cent. of the entire population (60 of the male and 70 of the female) was illiterate whereas it was found that in 1932 only 9 per cent. was illiterate.

In 1915 compulsory universal education in Russia was a far cry—a dream of only liberals and intellectuals. In the course of the next 17 years the result attained was surprising, for in 1932 free, universal and compulsory education for children between eight and eleven had become an accomplished fact ; and in the course of the present year it is to take within its fold all children between eight and twelve while in the cities and industrial centres only the age limit is proposed to be put up to 15 to be advanced to 17 in the next two years. The result reads like romance, but it shows what can be achieved by determination on the part of those who have the well-being of the people in their charge and the will to sacrifice on the part of the people themselves, thus co-operating with the authorities.

The eagerness of the people to receive education has been clearly demonstrated ; and it is a matter in which Bengal can congratulate herself that she has not overlooked the value of discipline. The Boy Scout movement which is now a world movement has found favour with our young hopefuls. Bengal is the one Province which has evolved and inaugurated a

similar movement ; thanks to the untiring efforts of Mr. G. S. Dutt, this pioneer movement, which is specially designed by him, is admirably suited to the conditions and needs of the Province ; we refer to the Bratachari movement which has caught the imagination of our boys and young men and ought to find a place in every educational institution of the Province.

Financial difficulties have so long stood in the way of making primary education in Bengal free and compulsory. But as it is the basis of all improvements and innovations money must be found for it. The people of the Province should be persuaded even to suffer sacrifices for it. Under the plan attempted to be sketched in this volume, effort has been made to indicate the way in which mechanics, engineers, chemists, agriculturists, organisers, managers, whom Bengal is so badly in need of, may be provided. The needs of tens and hundreds of thousands of them on this mammoth enterprise she will have to build up in the near future for her own salvation. To our amazement and consternation college graduates—multitudes of them—have been tried and found wanting. Their preparation must necessarily be so meagre that except in rare instances they cannot meet the responsibilities imposed on them. Our children should, therefore, receive, ordinarily, such education in the elementary stage as would fit them to prosecute successfully their studies in the technical schools and universities, so that they are able to gain command of the technical process which are of such decisive importance in our national reconstruction.

The Royal Commission on Agriculture in India stressed the importance of education thus :

“We are much attracted by the possibilities which a development of adult education on a large scale hold out. Such a development would antedate by at least a generation that great advance in literacy which, in our view, is essential to progress in all directions. Its influence in enlarging the scope of the cultivator’s horizon and in increasing his willingness to adopt agricultural improvements and his capacity to watch over his own interests in buying and selling commodities

and produce would be immense. Valuable time would thus be gained at a somewhat critical period, since conditions may not remain as favourable as they have been, and still are, for the introduction of the agricultural products of India to the world's markets with the beneficial reactions on internal prosperity which may be expected to follow. Even more important is the stimulus which would be given to the spread of primary education amongst the youth of both sexes."

As the Agricultural Commission pointed out the advantages of the spread of primary education among the agriculturists, so the Industrial commission wrote thus on its advantages on the industrial classes in India. Wrote the Commission :

"A factor which has tended in the past to delay the progress of Indian industrial development has been the ignorance and conservatism of the uneducated workmen. The evidence tendered by employers was almost universally in favour of labour, both skilled and unskilled, that had at least received a primary education. This is given in countries with which India will have to compete and is a *sine qua non* in this country also. Some witnesses stated that the spread of education among the artisan classes tended to bring manual labour into contempt, and that the sons of artisans, educated beyond the primary stage, showed a distinct tendency to forsake their father's callings in favour of clerical work, but we think this view must be due to the wrong system of education that has been made available. We found that while the employers of labour generally recognised the advantages of primary education among their work-people, as tending to make them not only more intelligent but also more self-respecting yet in comparatively few instances have they made serious attempts to impart such education. There are not wanting, however, instances of enlightened employers who have provided primary and even elementary technical education. In the case of the Buckingham and Carnatic Mills in Madras this has been done on liberal and efficient lines. The industrial bias imparted by the education given there has had the result of keeping the

pupils in the mills as intelligent and efficient workers, instead of leading them to desire clerical appointments, and the scheme may, therefore, legitimately be regarded as a good investment”.

Before entering into a discussion on the suitable forms of education, that should be made available to the masses, we might consult the views of the Marquis of Linlithgow on female education in India :

“It is idle to expect a boy to reap the full advantage of literacy, whose mother and sister can neither read nor write. No more potent instrument lies to hand for promoting rural development than a bold, determined and persistent drive towards the goal of a sound primary education for the girlhood of the countryside. There, plain for all to see, but hitherto so little apprehended, lies the key to India’s future. Privileged indeed will he be who will seize it with a firm and purposeful hand and, brushing aside the doubters and the difficulties, unlock and open wide the door that stands bolted and barred by the rusty prejudice of the centuries between the women of India and the high destiny that awaits them”.

As we have said before the aim and object of national education should be to fit all classes for their natural work. The Industrial Commission was perfectly justified in saying that a wrong system of education had been made available—a system against the introduction of which Raja Sir Radha Kanta Deb Bahadur had sounded the tocsin of alarm. It is a mistake and a danger to spur on every clever small boy with scholarships and money allowances, to try to get into a bigger school, and so through many bigger schools, with the stimulus of bigger scholarships, to a University degree. The result has been—as predicted by Sir William Wilson Hunter—an overgrown clerkly generation, whom the Government had trained in their youth to depend on Government allowances and to look to Government service, but whose adult ambitions not all the offices of Government can satisfy. Discount has been created among this disappointed class and disaster has followed. The disease has been properly diagnosed by His Excellency Sir John Anderson who laid his finger on the plague-spot when

in 1932 he referred to the tragedy of unemployment and traced its close connection with terrorism. "Year after year," he said at Chittagong, "our young men are growing up, aye and our girls now, to find no outlet for their energies. Unemployment is not the root cause of this movement (terrorism) but unemployment provides one of the fields of recruitment, and the dread of unemployment predisposes the minds of our young men to the morbid and fanatical outlook which the leaders of this movement seek to induce".

"Sovereigns and chiefs of nations," said DeFallenberg, "the fruitful source of sedition, of crime, of all the blood which flows upon the scaffold, is owing to the erroneous education of the people".

We are entering into a new field of activity. It should be our endeavour to avoid pit-falls and dangers and to profit by the experience of other nations, and other countries. We want education to be useful. There are four chief portions of education of mind. They are education—(1) in the power of observing, (2) in accuracy, (3) in the difficulty of ascertaining and (4) in proceeding from the knowledge of what is proved to the thinking of what is probable. That is what is wanted.

The elementary schools, therefore, should not produce "bookful blockheads" who carry a "learned lumber" in their heads. They should be taught to utilise their training fully and develop it by constant and careful practice. We would like to see a system of education developed with this object. It would be most desirable to have a small museum attached to each school to impart training through pictorial representation of men and things. A general outline of the Province, showing its mountains and rivers, its important towns and ports, its industrial centres and big market places should at once help the boy or the girl to form a general idea of the 'land we live in'. There should be samples of the principal articles we import and we produce. There should be portraits of our benefactors with a short account of their work for the benefit of the community—men like Ram Mohon Roy, Mohammad Mohsin, Premchand, Roychand, Rash Behary

Ghose, Ashutosh Mukherjee and Manindra Chandra Nandy, who occupy an abiding place in the history of the people of this Province. At the most impressionable period of their lives, before impressions have had time to harden into opinions, the children should be taught to think of the vast possibilities that lie before them, so that, as they grow up they can develop the ambition of service to the community by developing the resources of the Province,—if only they can cultivate energy without impatience and activity without restlessness.

If it is found impossible in the beginning to have a museum attached to each school, central museums should be established for a group of village schools and organised excursions undertaken to the museums. In Soviet Russia it is through these systematically organised excursions that the various museums are made to serve the aims of education and propaganda. In Russia various subjects are taught through these museums. Well-organised groups of students and school children are taken through these museums by official guides who have spent three years in preparation for their job. In one year, it is reported, 15,000,000 persons visited these museums. The requirements of each group must be studied. The school children must be brought in close contact with the processes of production. The peasants must be brought under the influence of proletarian and collectivist enterprises. This can be most conveniently and easily achieved by conducting well-organised excursions to museums and exhibitions—which afford a unique opportunity for education. To learn through the eye is a great advantage.

Elementary schools should be the seed-plots of education and their object should be to impart training which the trained can aptly and usefully profit by.

The ordinary type of education has been weighed in the balance and found wanting for the purpose we have and should have in view.

If in the case of our boys we want to develop a system of education especially suited to our requirements and conducive to the economic reconstruction of the Province, in the case of

girls we must have a system suited not only to the requirements of the society but also to them. Home is the woman's proper sphere and in our homes we want women who will uphold the best traditions of our culture and ideal and not mere replicas of an alien type. It is always an interesting sight to see an ancient society passing through an important change. From the middle of the nineteenth century in Bengal the change in the education and environments of our women has been the subject of constant thought and talk and effort. At every point woman improvement shows activity, and the question now is not whether the improvement should or should not continue but on what lines it is to be carried on. The elementary education necessary should be on the lines we select. The modern tendency to compete with men in education is to be deprecated, as it does not benefit society. One of our English educated religious reformers who had advocated social reform on Western lines, the late Protap Chunder Majoomdar, wrote in the evening of his life: "The ancient model of the woman's life was her absolute domesticity. Wife or widow, girl or grandmother, she practised all her life an utter self-devotion to the household, outside of which she recognised no obligation. . . . This predominant domesticity made the old-time Hindu woman (in Bengal) a strong housewife, exercising in certain things greater influence than the male members; it made her an expert cook, a clever economist, a good organiser, a formidable controversialist, quite a character whose place in the house and neighbourhood had to be reckoned with. Another characteristic of the old system was the unvarying religiousness of the Hindu lady. It was a most exceptional thing to hear anything said against the religiousness, or regularity, or ethical correctness of the Hindu household. The simple reason of it was that the ladies ruled these". The sense of simplicity, regularity, comfort and kindliness of the Hindu home in Bengal must be considered to be a precious heritage which we cannot afford to lose.

Change there must be and change is already perceptible. But anything like a revolutionary extreme is likely to be a

danger to society. Our educated men and women must take care not to contract into a small social sect but should be in full touch with our great society. It cannot be ignored that in the East woman has some of woman's peculiarities which must not be levelled down. Seclusion may not be defended but the dignity of retirement in feminine manners must be maintained. The Hindu woman hates to be dragged to the admiring gaze of the proletariat. She loves reserve, silence, self-concealment. She prizes knowledge, refinement, and the privileges of civilised society but she is temperamentally opposed to violent innovations which do not educate but expose her.* The wise thing, therefore, is to give her the education she requires and let her do what she feels is most natural. In old-time society her devotedness to the household, her thrift, and self-denial distinguished her; any neglect of household duty, household economy, and self-forgetfulness for other's good, however fashionable, would be considered neither education nor refinement, but the very reverse of it. In former days intense religiousness and scrupulous purity formed the model woman. Good care must be taken that she retains and cultivates her pious intuitions, and that the prevailing atmosphere of scepticism and irreverence does not infect her. "The academic part of woman's education is much less essential than the formation of manners, morals, and spiritual life". It is here that all the wisdom of our people must exercise itself.

This must be kept in view in evolving the system of elementary education which we want for our girls. It should suit the requirements of our domestic life. The education which should be imparted to our girls should make them discharge the duties which are their own. Nature has fixed a barrier between the two sexes which cannot be removed and the duties which appertain to women are not less important than those which men have to discharge. *

Elementary education for girls is as important as for boys, only the types of education need be different to fit the two sexes for their respective work, so that each may contribute his or her proper share in the development of the resources of

the Province and the progress of her people. While the basic purpose of education remains the same as it has always been—the preparation of a good citizen—our object is to prepare a new citizen for a new society. His preparation must proceed with full regard for the actual everyday tastes and obligations of the new citizen. He is to enrich his mind with the intellectual treasures of man specially all that makes for the benefit of the economic life of the society. He cannot afford to pursue a so-called liberal arts course which leads to no specific goal. His education must be purposeful so that he may prepare himself for a definite position in a new society in new environments.

The elementary school in Bengal must be made the one institution which should enjoy steady and galloping growth, even at the cost of all else. As long as we have such a calamity as illiteracy in our country, it is idle to talk of economic advancement or industrial development or political enfranchisement or social progress. In all ages and in all climes has the illiterate person been regarded to be a stranger to all thought of national uplift. He must be taught the A. B. C. Without literacy there can be no improvement in industry, agriculture, trade, or commerce and least of all in politics: there may be only rumours, gossips, fairy-tales, anything but national consciousness. The school is to prepare him for his life-work with Indian outlook of life—industry, commerce, agriculture and everything else that make up this life, the life of an Indian.

CHAPTER XXI

THE PROBLEM OF TRANSPORT

Roads are the highways of civilisation. But their importance is hardly confined to any one sphere of human activity. They are important for political and social purposes and their value as promoter of commerce and trade cannot be over-estimated. The Royal Commission on Agriculture in India devoted a chapter on communications and marketing in their Report in which they wrote as follows :

“As a factor of rural progress, we consider improvement of communications of the utmost importance. Improvement in communications and the spread of literacy are intimately related, for the closer connection between towns and country which an improvement in communications between them brings about must inevitably stimulate the more backward rural community to demand a higher standard of education as part of a higher general standard of living. Isolation perpetuates ignorance. Good roads promote the free exchange of ideas no less than that of merchandise.”

The Report then goes on to enumerate the numerous advantages of transport facilities and mentions the disastrous effect of bad communications not only on men but on draught animals as well.

India is a backward country both in regard to railways and roads. Of course, she also lags behind the advanced countries in most spheres of national activity ; in fact her railway development is ahead of her progress in other nation building departments. The Indian Railway Committee of 1921 pointed out the “humble position” that India occupies if a comparison is made between the mileage of railway per head of population in this and other countries. The Agricultural Commission made the position of India clear by giving

the following table—taking the figures from the Railway Statistics of the United States of America for the year ending December 31, 1920 and selecting for inclusion in the table the countries the extent of which or the predominantly agricultural character of whose population or both make a comparison with India of special relevance :

Countries	Mileage		Miles of line per 100 sq. miles.	Population per mile of line
	State Railways	Total Railways		
United States of America ...		249,398	8.42	469
Canada ...	26,596	40,351	1.0	222
India ...	27,264	38,597	2.2	7,894
Russia in Europe ...	24,509	35,528	1.5	3,709
Australia and New Zealand ...	28,277	28,748	0.9	238
Argentina ...	3,985	23,429	2.0	376
Union of South Africa ...	11,478	12,481	2.4	605

The comparison in the Table below between the mileage of roads in the nine major Provinces of India and the United States of America will be found interesting :

	Nine major Provinces of India		United States of America	
	240		31.5	
Density of population per sq. mile				
	Per 100 sq. miles of area.	Per 100,000 of population.	Per 100 sq. miles of area.	Per 100,000 of population.
Mileage of all roads ...	20.18	84	80.00	2,550
Surfaced roads ...	5.38	22	12.05	383
Percentage of roads surfaced ...	26.5		15.0	

The following statement shows the length of road communications maintained by public authorities in Bengal:—

Names of Divisions	Names of Districts.	Length of metalled roads maintained by the Public Works Department	Length of unmetalled roads maintained by the Public Works Department	Length of metalled roads maintained by local authorities	Length of unmetalled roads maintained by local authorities	Total of metalled roads	Total of unmetalled roads
Burdwan	Burdwan	107	...	400	1,183	507	1,183
	Birbhum	...	...	240	730	250	730
	Bankura	58-3/8	...	250	727	308-3/8	727
	Midnapore	112-3/4	...	440 3/4	1,193 1/2	553-1/2	1,193 1/2
	Hoochly	42-1/2	...	104 1/4	1,043	146-3/4	1,043
	Howrah	24-7/8	...	61 3/4	686 1/2	86-5/8	686 1/2
Presidency	24-Perganas	...	...	234-1/3	3,154-1/5	324 1/2	3,154-1/5
	Proper	*90-1/5	...	...	...	14	...
	Calcutta	14	...	114-3/4	2,007-9/10	114 3/4	2,007-9/10
	Nadia	...	...	64-7/10	1,574-3/5	64-7/10	1,574-3/5
	Murshidabad	...	...	140 1/2	2,019	181-4/5	2,019
	Jessore	†41-3/10	...	33	1,970	33	1,970
	Khulna	...	...	...	...	...	...

* Of this, 72.36 miles are maintained through the agency of the District Board.

† Maintained through the agency of the District Board.

The following statement shows the length of road communications maintained by public authorities in Bengal :—

Names of Divisions	Names of Districts	Length of metalled roads maintained by the Public Works Department	Length of unmetalled roads maintained by the Public Works Department	Length of metalled roads maintained by local authorities	Length of unmetalled roads maintained by local authorities	Total of metalled roads	Total of unmetalled roads
Dacca	Dacca	19	10 1/4	13 4/5	771 7/10	32 4/5	782
	Mymensing	...	...	85 7/10	3,690 4/5	85 7/10	3,690 4/5
	Faridpur	...	...	14 1/2	781 4/5	14 1/2	781 1/5
	Backerganj	...	...	25 2/5	1,268 3/10	25 2/5	1,268 3/10
Chittagong	Chittagong	6 3/10	43	14 3/5	2,600	20 9/10	2,643
	Nac'hali	1	22 4/5	6 1/4	1,031	7 1/4	1,053 4/5
	Tippurah	4 2/5	47 3/5	12 1/4	950	16 3/5	997 3/5
	Chittagong Hill Tracts	4 5	279 1/3	...	.....	4 5	279 1/3
Rajshahi	Rajshahi	...	...	66 1/2	1,413 1/8	66 1/2	1,413 1/8
	Dinajpur	14 9/10	...	35	1,419 1/4	49 9/10	1,419 1/4
	Jalpaiguri	132 7/10	56	75 3/4	739	208 1/2	795
	Rangpur	...	...	20	2,498	20	2,498
	Bogra	1 2/3	...	17 1/4	600 1/4	18 11/12	600 1/4
	Pabna	...	...	37	1,033	37	1,033
	Malda	...	...	36 3/4	603 1/4	36 3/4	603 1/4
	Darjeeling	222 4/3	131	18 1/8	406 2/5	240 11/24	537 2/5
Sikkim	*Sikkim	32	135	...	...	32	135
		926	725	2,563	36,094	3,489	36,819

* Funds are provided by the Central Government.

The statement proves the paucity of roads—good, bad or indifferent—in Bengal. The area of the Presidency of Bengal is 82,277 square miles, and the length of metalled roads is 3,489 miles and that of unmetalled roads only 36,819.

That the Government are fully alive to the importance of roads is to be conceded. Before the establishment of the British Government the only roads in existence in Bengal worth mentioning were the trunk roads constructed mostly by Moslem rulers for the use of the army and as means of communication between principal centres of administrative importance. The traditions that entwine themselves round one or two other roads are those of pious men and women who constructed them for purposes of pilgrimage. Needless to say the rivers which intersected these roads were not bridged and were difficult to cross.

The history of roads in Bengal under the British begins with those constructed with convict labour. The next step was the utilisation of the "Ferry Fund" for purposes of road development. The ferries were then directly under the control of the Provincial Government. The condition of the ferry service was far from satisfactory. Lord Mayo was a first class sportsman and passionately fond of pig-sticking, for which purpose he used to pass through Chooadanga (in the Nadia District) often taking his own Irish hunters with him. Once as the river was being crossed in the ferry boat of the period one or both of the Governor-General's hunters—unaccustomed to the job—got frightened and jumped overboard, and there was some delay and trouble in swimming to the other bank. Lord Mayo was vexed. Though he did not say much, six weeks later there came down a circular letter from the Government of India addressed to all local Governments and administrations calling attention to the general inadequacy of ferry boats on Indian rivers, and insisting on their improvement.

An important step was taken by the passing of the Bengal Road Cess Act of 1871. This Act was passed to provide for

local rating for the construction and maintenance of roads and other means of communication in Bengal. Calcutta and District Municipalities and towns were excluded from its operations. As the imposition of the Road Cess was objected to on the ground that it was being levied in violation of the conditions of the Permanent Settlement, the Duke of Argyll as Secretary of State for India penned an exhaustive Despatch, in which he said :

“That it is above all things requisite that the benefits to be derived from the rates should be brought home to the doors of the cess-payers, and that these benefits should be palpable, direct and immediate.”

To make this still more clear Sir George Campbell, the then Lieutenant-Governor of Bengal, issued a proclamation from which two extracts are given below :

“All persons assessed to the Road Cess are informed and assured by the Government that every pice levied under the Act will be spent in the district in which it is raised to improve the local roads, canals and rivers in the district for the benefit of the inhabitants. Nothing will be diverted to any other purpose than that which the law directs.”

“Every tax-payer is encouraged and invited to claim that the tax shall be fairly applied to the village roads and local paths and water channels in which he is interested.”

The Cess Committee was formed. The Administration Report of the Collector of Nadia for 1878 threw important light on the roads of those days. Wrote the Collector, Mr. (afterwards Sir Charles) Stevens :

“The district is intersected, as it were, by a network of roads of different descriptions. Prior to the introduction of the Road Cess their aggregate length amounted to 642 miles, of which 159 miles were metalled and 483 miles were unmetalled. Of these, 12 miles

metalled and 15 miles unmetalled roads are repaired by the Public Works Department at present. A good many new roads have been constructed since, and the metalling of some of the old roads has been extended. The total length of existing roads amounts to 749 miles at present, exclusive of village communications of which there are over 300 miles in this district. The necessity of existing metalled roads is quite unquestionable. With the exception of two they are all feeders to Eastern Bengal Railway. The Government constructed them at an enormous outlay pressed by the sense that they were greatly needed, but prior to the introduction of the Road Cess, spent a large sum annually from the Provincial Funds for their renewal and maintenance. And besides this the Government used to give a separate grant, varying between Rs. 40,000 and Rs. 65,000 annually for the improvement and maintenance and repairs of the existing unmetalled roads."

The stopping of this grant, said the Collector, had been a source of disappointment to the people who had been taxed at the maximum rate provided by the law because, "the public at the passing of the Road Cess Act expected that the revenue to be derived from this source would be mostly spent in constructing new roads and bridges in accordance with the requirements."

The demand for roads could not, then, be met even in 1878.

What is being done in other countries in this direction can be seen from the fact that although France has beautiful roads and ever since the Franco-Prussian War, France had gone on constructing roads in anticipation of another and a bigger war with Germany which came upon her in 1914, yet in the Five-Year Plan, for which the sum of £120,000,000 was sanctioned by the French Cabinet on the 17th May, 1934, it was stated that at the end of the programme France will have a new net work of first-class highways among other things.

The importance of roads was thus admitted and the construction of roads placed before the supply of electric power in the countryside and the establishment of schools and provision of sanitation and water supply. The reason is not far to seek. The introduction and development of motor transport has immensely increased the importance of roads. The production and distribution of material, wealth are of necessity very closely allied. They intertwine at all points and are continually dependent on each other. Production demands distribution and facilities of distribution stimulate production. Thus the railways and canals of Pennsylvania were the principal factors in creating its coal and iron industries. Then the coal and iron industries in their turn became a main support of the railways.

Motor transport is a new factor in the economic expansion of the world. But in Bengal, due to paucity of good roads, their utility is practically lost; and, for reasons into which it is needless to enter here, the hope of having good roads in Bengal within a period of five years is almost surely doomed to end in disappointment, on account of difficulties of the soil and other factors.

A short time back (on the 14th June, 1934) the Government of Bengal issued a Press Note announcing the appointment of a Special Officer for Road Development and the decision to capitalise a portion of the proceeds of the Motor Vehicles Tax Fund in order to finance the construction of bridges. The Government of Bengal, thanks to the zealous efforts of the Hon'ble Sir Bejoy Prasad Singh Roy, Minister in charge of the Local Self-Government Department, have prepared a five years' programme of road development to be financed from grants received from the Central Road Fund composed of the receipts from the increased taxation on motor spirits imposed in 1929-30. Grants are made out of the Fund to Provincial Governments in the ratio which the consumption of petrol in the Province bears to the total consumption in India in the preceding calendar year.

The receipts of the Government of Bengal from the Central Road Fund up to the end of the last six months of the year 1933-34 were as follows :

	Rs.
1929-30 (including March, 1929) . . .	13,99,435
1930-31	13,28,903
1931-32	13,79,053
1932-33	12,73,664
First six months of 1933-34	6,40,000
Total	60,21,055

But even in the matter of utilising this small amount the Government of Bengal have not been given a free hand. The grants received from the Central Road Fund can be spent only on such road development schemes as have the approval of the Government of India.

The programme referred to consists of 13 projects—the total length of the roads concerned being $326\frac{1}{4}$ miles and the length taken up under the programme $211\frac{1}{4}$ miles. The total estimated cost will be Rs. 66,91,085. Thus the five-year programme of road development announced involves the construction of only 200 miles of road. The Press Note issued by the Publicity Officer states that an intensive effort will be made to push on road development and the hope is expressed that it will not be long before the facilities of transport and communication in the Province are considerably increased. But unless and until more funds are available the intensive effort referred to will not be able to effect a decided improvement in the development of roads in Bengal in the near future, and without good metalled roads facilities for motor transport must remain restricted:

A vigorous programme of road construction should be undertaken, specially in places where water transport is difficult to organise. In this matter the position has nowhere been more clearly expressed than in the Report of the Royal Commission on Agriculture in India :

“The provision of excellent main roads adequate in all respects for every form of transport is of little benefit to the cultivator if his access to them is hampered by the condition of the road which connects his village with them. What matters most to him is the state of the road between his village and the main road and his market. We agree with the view expressed by the Indian Taxation Enquiry Committee that it is difficult to exaggerate the political and economic advantages of the development of motor transport in India and that it is desirable that the development of motor transport services should be encouraged. We should, however, consider it unfortunate if the growing sense of the need for improving main roads were to divert attention from the need for improving the subsidiary communications which are of even greater importance to the cultivator. We, therefore, hold that along with the policy of developing main roads should go that of developing communications between them and the villages which are not situated immediately on them.”

This was exactly the policy laid down in connection with the utilisation of the proceeds of the Road Cess.

Before the advent of motor transport the railway was the most important carrier on the land as the steamer was on the water. The energy with which America constructed her railways made people think that the science of transportation was going to be the special contribution of the American people to political economy. It was the most instructive feature in their economic system and the achievements which they accomplished through it read almost like fables. It was the magician's wand, calling towns into existence on the naked prairie, raising towns into cities and cities into world-famous hives of wealth and industry. About fifty years back railroads were still the chief and almost the only financial power in Wall Street. It was then that the following justified tribute was paid to their influence :

"The growth of our railroad system has been coincident with the marvellous development of our national wealth and production, they practically stand together as cause and effect. Sixty years ago we had, say 12,000,000 people and no rail roads. New York had about 200,000 population, Philadelphia 167,000, Baltimore 80,000 and Boston 61,000. No other city of the country numbered 50,000. St. Louis had less than 6,000. Chicago, Kansas City and Denver were unheard of. In the thirty-five years that followed we built an average of a thousand miles of railroad per year, and then in eight years built thirty-five thousand miles more. This eight years' construction represented an expenditure of nearly fifteen hundred million dollars. What was the foundation or reason for such a vast outlay? It was found in the wonderful development of our agricultural and mineral resources which had followed the earlier railway work."

The effect of railroad construction had indeed been wonderful. Great States had been created and populated by reason of the transportation facilities provided. The mileage in Illinois increased from 3,156 to 6,589, in Iowa from 805 to 3,728, in Kansas from 40 to 2,100, in Missouri from 925 to 2,858, in Nebraska from nothing to 1,107 and in Texas from 451 to 1,578. In 1873 there was one mile of railroad for each 583 inhabitants. Then came a lull after a period of feverish activity. Financial intoxication was followed by the inevitable depression. In the five years ending with 1873, 28,039 miles of road had been built, and in the five subsequent years only 11,499 were added. But in the nine years from 1879 to 1887 no less than 67,754 miles were opened of which nearly 13,000 miles were built in the year 1887.

But the introduction of the motor transport has a new bearing on the problem of transportation. It has haunted the railroad authorities like a nightmare. Though the motor transport bogey has passed out of the hysterical stage and can now be regarded with comparative calmness, it is far from

being disposed of. Railroad authorities are growing accustomed to the formidable competitor who has sprung so suddenly in the centre of the arena and are recovering from their first fright at the invasion. The bogey is no longer so alarming as it was, but it is still regarded with interest, the interest is of a more intelligent and less hysterical sort. Foolish panic has changed to rational curiosity as to the true significance of a strange phenomenon.

Attempts are now being made to make an adjustment, for the motor lorry has come to stay.

As we have said before, the science of transportation seems to be the special contribution of the American people to political economy. And America has gone carefully into the matter of co-ordination between rail and motor. The National Transportation Committee "met and organized" on October 7, 1932. The Committee expressed the opinion that the railroad system must be preserved. Changed conditions require new policies but not abandonment of railroad regulation. It has been held that "an ideal co-ordination of rail and highway transport beyond the zone where the truck may do the work alone more economically and with speedier service, would be an arrangement whereby the trucker might take the goods from the door of the shipper in some kind of container to a point on the railroad outside of the congested areas, and transfer the shipment for rail haul, then re-transfer to highway, and thence to door of consignee."

A survey and study of rail and highway transport in America—with co-ordination as the basic objective—to the end that the best possible system of land transportation be established at lowest cost, brings out the following points:

(1) Co-ordination to a high degree, of rail and motor operation, should make possible an ideal form of land transport joining the flexibility of trucks in terminal operations with the low cost of road haul to rail.

(2) The motor vehicle may be used by railroads to improve their own rail operations; it may be used by independent operators or groups in competition with rail transport; or it

may be employed by railroads themselves for the purpose of engaging in a general motor operating business. The highest degree of co-ordination is involved in the first case.

(3) The greater the railroad's participation in motor transportation the greater may be the extent of co-ordination. Rail-motor co-ordination can best be accomplished through use and not through restriction. Thought should run along the line of rails *and* motors and not rails *versus* motors.

(4) The rail and motor should co-ordinate more specially at points where railroad operations are most limited and expansion most difficult and costly ; namely, in urban areas. A comprehensive use of the motor at terminals will relieve the railroad of various forms of costly and delayed service. For transfer and consolidation of freight, the motor truck, trailer, and demountable truck body are admirably suited.

(5) Proper co-ordination of rail and motor to the degree of setting up effective pick-up and delivery service should in most cases relieve congestion in terminal districts, greatly increasing the capacity of certain freight stations and permitting the elimination of others.

(6) In the unification of freight terminals or steps leading thereto, the truck can play an important part in increasing flexibility of operation.

(7) To secure the fullest benefit from co-ordinated rail and highway transport, there should be utilised and further developed practical auxiliary equipment along the line of containers, demountable truck bodies and trailers.

(8) The bus can be used to replace certain unprofitable branch line passenger service as well as that of local main line trains. The use of the motor will permit the pruning of railroad equipment and facilities, including stations and general structures, and create a great saving. Bus lines often serve a class of people who might not be able to travel by rail.

As the *American Transportation Problem* prepared for the National Transportation Committee (1933) has pointed out :

“Each form of transportation has its advantages and disadvantages. Each is essential to the maintenance

of the most efficient distribution for the benefit of both producers and consumers. Each should be maintained in the field of its greatest usefulness to the public. The process of working out this relationship in any particular territory is dependent on factors which vary in each instance".

The main recommendations of the Mitchel-Kirness Report in India are also practically on the above lines.

We are purposely refraining from treating at length the railways in Bengal. The railways are under the Government of India and under the immediate control of a Board. Local administrations cannot, under existing arrangements, exercise any direct control on them. This arrangement should have to be modified and the local Governments allowed to have a voice in the administration of the railways passing through their territory. The Railway Board is fully aware of the necessity of the railways rendering every possible help to the industries. On March 21, 1916, Sir Ibrahim Rahimtulla moved a resolution in the Imperial Legislative Council recommending the appointment of a Committee "to consider and report what measures should be adopted for the growth and development of industries in India." This resolution was accepted by the Government and in speaking on it on behalf of the Government Sir William Clarke referred to the action taken by the Railway Board. "The Railway Board," he said, "have impressed upon the different railway administrations the desirability of watching carefully for opportunities for fostering local industries by the quotation of favourable rates for the carriage of the raw material required in manufacture and of the finished product. They circularised all the administrations on the subject early last year. The interests of the railways and of the industries in this matter are identical since the new industry brings more traffic to the railways." Sir Charles considered it desirable to impress this upon the Railway administration once more.

The local Government will be in a better position than any other body to recommend encouragement for particular

industries and their recommendations should be accepted by the railway administrations. Favourable rates should be quoted for certain classes of goods and inequality of rates, where they exist, should be removed. That such inequalities have been complained of we know. In his evidence before the Industrial Commission Lala Harkissen Lal said, "The freights on cotton work out per mile a great deal more to the Lahore Spinning Mill than to Cawnpore Mills." We hear now a good deal about the inequality of freights on coal in different railway systems.

Here we would suggest the establishment of a Rates Advisory Council in each province to advise the Railway Board on various problems relating to the railway rates and freights. The Committee we have in view in Bengal should consist of :

- (1) The Director of Industries,
- (2) The Director of Agriculture,
- (3) The Joint Secretary, Commerce Department,
- (4) Two Indian Representatives of Indian Commerce to be nominated by the local Government,
- (5) Three Officers—one each of the E. I. Railway, the E. B. Railway and the B. N. Railway.
- (6) Development Commissioner.

Its functions should be purely advisory. This Committee should make special study of the industries including agriculture of the Province with a view to their development.

This takes us to consider the question of water transport. Intersected as Bengal is with water channels—rivers and canals—her waterways had been extensively used in the past as the most convenient means for the carriage of goods and passengers. Almost every village had its fleet of boats, big and small, and even some private individuals had their boats for their own exclusive use. Country produce was moved in country-boats and an important industry was developed in Bengal which became well-known for its boats.

In many parts of Bengal for some months during the year boats were the only means of communication. Boats, from

the frail bark of the fisherman to the huge *sloops* of Chittagong, from the large cargo boats to the famous green boats or *Bhowlias*, various kinds of vessels were built in Bengal—almost in every part of it. And even Englishmen, in the early days of the East India Company took to shipbuilding in this part of India, the land of rivers and plain. “The Hon. Robert Lindsay, a son of the Earl of Balcarres, who succeeded as Resident or Collector of Sylhet in 1778, four years after Thackeray left, grew quickly rich as a wholesale lime merchant and shipbuilder.” •

No country can neglect its waterways. It is a very common, though mistaken, inference from the high development of America's transportation system that she is favoured with great natural facilities for the distribution of wealth. Her “magnificent” waterways and her “splendid natural harbours” are frequently appealed to in explanation of her marvellous progress. These are mere rhetorical phrases. Human skill had to be employed to improve them. The New Orleans, for instance, started with few natural advantages. No port indeed could have had fewer. When the French explorer, Bienville, made his first voyage up the Mississippi in 1699 he had to cut his way through drift and snags. When the French Government in 1726 initiated that long and checkered course of river improvement which culminated in the Eads jetties, the depth of water was only 6 or 8 ft. and there was a bar across the mouth of the main channel which had often not more than 4 feet of water in it. Dredging operations were carried on all the time, but their effect was temporary. But the settlers who had come down from Kentucky, Tennessee, Ohio, and the middle states insisted on help from the Government for opening up navigation. The Congress took action, and in 1829 the first of a long series of experiments was begun at the public expense. Boats were put on to clear out snags, sharp bends were reduced and the channel straightened, the bottom was harrowed and stirred up in order that the mud might be carried away by the current, still no permanent effect was achieved, and what to do with the Mississippi remained a very perplexing question

until Mr. Eads came along and proposed to make it cut a new mouth for itself. The Congress was divided and at last the matter was referred to a technical commission of seven engineers. In January 1875 the experts reported in favour of the jetties, and Mr. Eads promptly submitted a tender for their construction. A Bill was at once introduced embodying this proposal, and in the following March it became law. The terms of the contract were that Captain Eads should, within thirty months, have formed a channel 20 feet deep and 200 feet wide at the bottom. Thereafter he was to receive \$500,000 for every additional 2 ft. in depth, with corresponding widths at the bottom, until a depth of 30 feet and a width of 350 feet had been obtained. His total remuneration was to be five and a quarter million dollars, with \$100,000 a year for twenty years to keep the jetties in repair. Captain Eads achieved a glorious triumph. The operations of a single year increased the depth of the channel from 10.2 feet to 23 feet. In 1883, four years after the completion of the work, the range was from 30.2 feet in January to 33.4 feet in June. Many engineering miracles were performed during the nineteenth century, but there were few to equal in rapidity and success the deepening of the mouths of the Mississippi.

We have given an example of the skill, labour and money spent in America to deepen the mouths of a river which raised New Orleans at a stroke from a fourth class to a first class port. We will now refer to the Manchester Ship Canal in England.

The ship canal was opened for traffic on the 1st January 1894 and formally inaugurated by Her late Majesty Queen Victoria on May 21, 1894. The opening of the Port of Manchester was an event of striking importance to the trade in and around Manchester because it "marked the dawn of emancipation from the excessive freight charges that had threatened to stifle local commercial and industrial undertakings." So great has been the change brought about by this deep waterway from the sea, 35 miles long, that it is somewhat difficult now to realise the conditions of transportation when Manchester was but a point in the interior. As a striking

illustration of the value of the Port to the trade of the district, the case of the staple industry at Lancashire may be cited. "Those who are able to speak authoritatively on the subject avow that the saving to the trade in removing raw Cotton from the ships and forwarding manufactured articles to the ships is equivalent to a gain of at least half a million sterling (pounds) a year. On the cost of shipments of cotton yarns to continental towns a reduction of 10/- a ton was effected in pre-war times in comparison with the rate charged prior to the construction of the Waterway."

Thus it appears that America and England spent huge sums of money in "creating" waterways for the development of industries and trade and commerce.

Inland water transportation played a role of tremendous importance in the early development of America. As a matter of fact until almost the middle of the nineteenth century, the economic expansion of America was primarily determined by the location of rivers and canals. The American Government had to spend lavishly on waterways (1890—1931) :—

Mississippi system	...	...	\$472,984,507
Inter-coasted canals and other water-ways	...	...	\$104,903,915
Operation and care of canals	...	...	\$104,487,905
Examinations and surveys	...	...	\$8,221,374
Seacoast harbours and channels	...	...	\$515,954,872
Great Lakes harbour and channels	...	...	\$163,303,189
Total			\$1,369,855,762

In Bengal we have the waterways ready and only utter neglect has made them deteriorate. The cost which will have to be incurred in making them ready for use will be considerably less than that required to construct motorable roads or railroads. Consequently in Bengal the main argument in support of the rehabilitation of inland water transportation is that it is inherently much cheaper than transportation by rail. It must

be clearly understood that the conditions in Bengal are different from those in America and England. The rehabilitation referred to will result in other benefits to the people, viz., irrigation facilities and improvement of health.

Like Germany and Netherlands, Bengal can conveniently and profitably utilise her waterways for goods traffic. The first important step in this direction, thanks to the efforts of Nawab Bahadur Sir A. K. Ghuznavi, has, fortunately, been taken by the passing of the Bengal Waterways Trust Act which, though a modest measure will, it is hoped, inaugurate a new policy in the work of improving the waterways of Bengal which had so long remained neglected. The trust which the Act seeks to create will occasion a welcome departure from the policy so long pursued. The first objective of the Trust should be to revive the dead and dying rivers and canals of the Province. Since rivers flow over long distances and are invariably connected with others, it is indispensable that a comprehensive survey should be made preliminary to a plan of action. The important trunk routes are to be tackled first and then the feeders are to be rehabilitated. Even in the case of "live" rivers, "training" will occasionally be needed for regulating the flow to the advantage of traffic through them and also of the towns and villages on their banks.

The improvement of water transportation will give an impetus to the old and once prosperous industry of boat building. Suitable timber is available in the Province and the skill of boat-builders can be fully utilised in boat-building centres.

But the old order must be changed. Boats carrying goods will have to be insured against loss. Boats, therefore, must be standardised and built according to specifications laid down by insurance companies. This will afford scope for the establishment of numerous insurance companies.

Those who have read accounts depicting the social and economic life of Bengal even fifty years back will not be surprised to learn that it is not impossible to make the boats the general carriers of goods in Bengal once more. In the old days of John Company goods were carried in boats. On his

way to Patna in 1762 Warren Hastings found to his surprise every boat he met on the river bearing the Company's flag which "bode no good to the Nawab's revenues, the quiet of the country, or the honour of our nation."

These boats can be built so as to be towed whenever necessary or possible by steam or motor tugs. This arrangement will not only ensure quick transit of goods but also saving of labour.

Except during the two months of the years when nor-westers make their appearance it is safe to use the country boats for ordinary carriage of goods.

In addition to the boats inland river services should be organised wherever found necessary. Already this mode of transportation is finding favour with the people and the most prominent among the Bengalee inland transport companies—the East Bengal River Steam Service—has proved a profitable business venture. And it is a matter on which we can congratulate ourselves that the example of this Company which has slowly but steadily developed, has been followed by others.

The improvement of the waterways should be undertaken wherever necessary and the improvement and maintenance will be far less costly than the construction of new roads with their inevitable concomitants—bridges and culverts. The imposition of tolls would cover the cost of maintenance of the channels.

A number of inland carrying companies will have to be established in the various parts of the Province. It is well-known that in the case of several light railways the District Boards interested have not only allowed the use of their roads but have also guaranteed a minimum dividend to the shareholders of the companies. The District Board of the 24-Perganas has had to guarantee a minimum dividend for the Baraset-Basirhat Light Railway while the District Board of Jessore paid year after year comparatively large sums to make up the guaranteed dividend for the Jessore-Jhenidah Light Railway. A different treatment should not be accorded to water transport. Wherever necessary the District Boards should guarantee a minimum dividend on the capital of inland steamer

companies. These companies may also be entrusted with the work of carrying the mails and paid for it by the Postal Department. Each Company should be given the monopoly to ply on some specified rivers or canals and between specified stations. Small companies can federate into a bigger company which would be in a position to issue debentures when financing will be necessary for opening new lines. The smaller lines would act as feeders and carry goods and passengers from inland stations to central stations where they would be handed over to the bigger steamer companies, after the method suggested for co-ordination between railways and motor services in America.

To the Central Stations not only small steamers but also country-boats will bring goods and passengers and thus a network of carrying agencies will be established all over Bengal.

Under existing circumstances, the development of water transportation is very important. The time may come when the roads will supersede the waterways. But that time has not yet arrived because road-making in Bengal is more costly than in some of the other Provinces where the land is not so low-lying and where the number of bridges to be constructed must be fewer. The waterways of the Province or rather every part of the Province have to be carefully examined and necessary arrangements for the outflow of water made, attention being also paid to the needs of irrigation.

Two maps, one showing the principal navigable routes of the Province and the other indicating in detail the feeder routes that may be profitably developed in particular areas (in the map one district has been taken), have been attached at the end of the Chapter.

For some time to come it will be more convenient to use the waterways of Bengal—the ways nature has provided and which had served the people so well for centuries. With a carefully prepared programme for the improvement of waterways it would not take us more than two to three years to make them as useful as before.

The waterways of Bengal are a valuable asset and easy to utilise. It would be a folly not to utilise them and reap full benefit from them.

A comprehensive programme of transportation development, in which the locomotive, the motor bus and lorry, the steamer, the motor launch and the country-boat each, will have its well recognised place and will in the near future be joined by the aeroplane, is the supreme need of the hour.

CHAPTER XXII

PUBLIC HEALTH

The economic progress of a country is so indissolubly bound up with the improvement in the health of the children of the soil that in any scheme of planned action in regard to its economic regeneration public health must play a dominant part. Any attempt to underrate its importance would be to go backward and not to march onward towards the goal. Health is truly and aptly described as the wealth of the nation. Yet what with malaria levying its unusual toll of hundreds of thousands, cholera decimating the rural population, and other epidemics carrying on their relentless campaign, public health is in such a deplorable condition in Bengal that the vitality of her people is fast ebbing out and has already gone down to a level which is at once distressing and alarming. If this state of things is not changed—the march of maladies is not arrested—important country-sides which had at one time been busy hives of human life and labour will soon be deserted and depopulated ; indeed signs of such decay are already visible in many places. In Bengal the problem of sanitation and public health is specially acute and beset with innumerable difficulties.

Speaking of these difficulties in almost every part of India Sir William Wilson Hunter in his brilliant book on Orissa wrote about sixty years back :—

“In no country does the public health more urgently demand the aid of that science as in India. But the ignorance, prejudice and suspicions of the people on the one hand, and the vast demands upon the revenue for more visible and perhaps more urgently needed public works on the other, do not leave sanitation a chance. Medical men are driven from one project to another, as

each is found to be either too costly to Government, or too opposed to the superstitions of the natives."

Sixty eventful years have rolled by and though the attempt to "bid the sickness cease" has not been successful science has placed at the disposal of man means to combat those enemies which had previously been considered invincible, those epidemics which like famines recur, in the words of Sir Romesh Chunder Mitter, "with the periodicity of climatic changes" and which were considered to be visitations of Providence. But the causes which have combined to convert Bengal into a magazine of mortality have not yet been removed with the help of scientific means.

During the year 1931 as many as 3,333 deaths from cholera occurred in the towns and 75,740 in the rural areas. When we are told that during the year (a) 295,405 cubic centimetres of anti-cholera vaccine were issued and the number of inoculations performed was 1,832,817 ; (b) 180,753 wells and 36,509 tanks were disinfected in addition to 1,876 river ghats, 14,833 houses, 3,695 *dobas* and 917 latrines and (c) pilgrims to Puri *Rathajatra*, *Ganga Saugar Mela* and the *Haj* were inoculated, and yet about 80,000 people died of cholera we can form an idea of the vast amount of work which still remains to be done and which demand the urgent attention of the authorities, the local bodies and the people.

The result of inoculating pilgrims to the Puri *Rathajatra* and the *Ganga Saugar Mela* resulted in the number of cases of cholera being negligible. This should make the inoculation more extensively practised like vaccination for small pox, which was responsible for 9,207 deaths only during the year 1931 perhaps mainly because of the fact that the total cost of vaccination in 1931-32 was Rs. 4,74,355-1-11.

Lantern lectures and magic lantern demonstrations together with the distribution of leaflets and the display of posters are methods of propaganda adopted to educate the public.

Though cholera is "fierce as ten furies", the great killer in Bengal is malaria which was responsible for 349,111 deaths in 1931. Of all the districts Backarganj alone showed its pre-

valence below 10 per cent., while the districts of Birbhum, Nadia, Burdwan, Hooghly and Jessore showed a black record of over 50 per cent. The Government have not been unmindful of the tragedy. Quinine distribution has been resorted to and every year a considerable quantity of quinine is supplied free. But much remains to be done. In 1930 Major Graham Pole is reported to have drawn the attention of the Secretary of State for India in the House of Commons to the statement of the Director of the Botanical Survey of India, in his report for 1929-30 to the effect that charitable dispensaries have to turn malaria-stricken patients away empty or with inadequate doses.

But new discoveries are not neglected as will appear from the inauguration of a new experiment in Burdwan last year. On the 30th January, 1933, His Excellency Sir John Anderson said at Burdwan, "It has been discovered that while the administration of quinine reduces and may apparently eliminate the traces of malaria in a human being that human being may continue to be infective to an *anopheles* mosquito and so be an unsuspected source of danger to others whom that mosquito may attack. A drug has now become available called Plasmodochin, which, it is claimed, will, if taken with quinine for three days, render the patient non-infective to mosquitos. The present proposal is, therefore, to administer this drug with quinine on a large scale in a selected area". The treatment is expensive. But the Government decided to try the experiment in an area of approximately 50 square miles at a cost of about Rs. 20,000.

This experiment was initiated chiefly through the untiring energy of the Hon'ble Sir Bijoy Prosad Singh Roy, Kt., Minister-in-Charge, Department of Public Health, who is keen on improving the health of the Province but severely handicapped by financial stringencies of the Government. His latest utterance on the experiment is very hopeful. It appears from his speech that the selected area of operation was 44 square miles with a population of about 21,000. The aim of the scheme, needless to say, is to provide for early treatment of malaria patients which (i) cures patients early, (ii) cuts down the number of days they

remain sick, (iii) cuts down the number of days of incapacity which is the greatest evil and (iv) prevents persons getting infected. It appears that at the end of a year after the introduction of the experiment it was found that while the average parasite rate amongst children under 12 years was 33 per cent. in control area it was 17 in the experimental area.

It is too early yet to pronounce an opinion on the result of the experiment ; but if it proves successful it may be possible, with an annual expenditure of Rs. 13,00,000 continued over six years, i.e., with Rs. 78,00,000 in all to bring malaria under control and ultimately to make the Province malaria-free.

Kala-azar is now amenable and responsive to treatment, and much has been done by private organisations to combat its ravages. But phthisis which was previously called the "white plague" is assuming dangerous proportions. And the need for having a National Council for combating Venereal Diseases—on the lines of the Council in Great Britain—is being increasingly felt.

For the success of measures adopted to improve the health of the people of Bengal much must depend on the co-operation of the people, specially the educated public. The close connection between food and drink and health, the importance of the maternity and child welfare movement, the necessity of living healthy lives, all these must be explained to the ignorant masses before they can be expected to move out of the ruts into which they have fallen. It is by example and advice that the educated people can convince the masses that a change is necessary.

That the "sanitary conscience" of the people is being awakened is evident from the fact that the demand for officers and materials from the Educational Propaganda and Publicity section of the Public Health Department is on the increase. This is a hopeful sign and the opportunity should be fully utilised.

Health work is increasingly enthralling the attention of the civilised countries, so much so that the League of Nations

has considered it necessary to publish an International Health Year Book and the reason for it has been explained thus in the preface to the first volume :

“The development of public health activity is rapid, and changes in legislation and procedure are constantly taking place. For these reasons it has been thought well to supplement the information contained in the hand book by the issue of an annual progress report, in which the more important developments during the preceding twelve months will be briefly reviewed”.

A study of the various sections into which the health activities in the thirty four countries and colonies from which reports have been collected would serve as an object lesson to us in India. Considerations of space preclude the possibility of our giving details and we must remain satisfied with a synopsis of the sections of public health work in three countries only :

I. England and Wales

(a) Prevention and treatment of infectious diseases :

- (1) Campaign against acute and chronic diseases
- (2) Public health legislation
- (3) Tuberculosis
- (4) Venereal diseases

(b) Public health activities—

- (1) Protection of maternity, infancy, and of pre-school age
- (2) Welfare of the blind
- (3) The health of the school-child
- (4) Housing
- (5) Town planning
- (6) Water supply
- (7) Pollution of rivers
- (8) Sewage disposal
- (9) Public cleansing
- (10) Public parks, pleasure grounds and playing fields
- (11) Local government administration

II. United States

(a) Acute infectious diseases

(b) Chronic diseases

(1) Tuberculosis

(2) Malaria

(3) Cancer,

(4) Venereal diseases

(5) Alcoholism .

(6) Federal provision for treatment of drug addiction ,

(c) Social medicine and public health

(1) Sanitation

(2) Housing

(3) Water supply .

(4) Sewage disposal

(5) Milk supply

(6) Protection of maternity, infancy and the child
of pre-school and school age

(7) Health insurance

(8) Public health education

(d) Curative medicine

(1) Hospitals and sanatoria

(2) Dispensaries

(3) Pharmacies

(4) Physicians, medical students, dentists, pharmacists, midwives, nurses and other medical personnel

(e) Budget

III. Union of Soviet Socialist Republics

(a) Campaign against infectious diseases

(i) Acute infectious diseases

(1) Plague

(2) Cholera

(3) Relapsing fever and typhus

(4) Small pox

(5) Typhoid fever and dysentery

- (6) Acute infectious diseases of childhood
- (7) Influenza and epidemic eucephalitis
- (8) Anthrax
- (9) Other infectious diseases
- (ii) Chronic diseases
 - (1) Tuberculosis
 - (2) Venereal diseases
 - (3) Trachoma
- (iii) Unifications of methods of combating infectious diseases (measure against parasite, typhus, small pox, malaria, etc.)
- (b) Social medicine and public health
 - (1) Maternity and infant welfare
 - (2) Welfare work for children and young people
 - (3) Health supervision
 - (4) Sanitation in inhabited localities
 - (5) Food hygiene
 - (6) Public health instruction
- (c) Health legislation
- (d) Curative medicine

Such are the heads under which the work is divided in the three countries referred to.

The divisions into sections in these countries show what an amount of work remains to be done in Bengal which is certainly far more in need of health work than any of the three countries referred to.

We are aware how a resolution accepted in the Bengal Legislative Council more than ten years ago to have a charitable dispensary at every *Thana* has not yet been given effect to only for want of adequate funds ; and the number of hospitals worth the name is almost insignificant. The United States of America had in 1920 a population of 105,710,620. In 1929 there were 7,515 hospitals of all classes in (continental) United States with a total bed capacity of 914,910 a gain of more than 35,000 beds over the preceding year. The average ratio of active beds to population there was one bed for every 240 persons,

a number which is considered inadequate, the need for hospital beds being now commonly estimated at one for every 200 population or even one to 150. There is, of course, a seasonal fluctuation in occupancy, but the average occupancy, according to the survey made by the Modern Hospital Publishing Co. is 79 per cent. or 719,622 beds. In Bengal cases have been known of patients being refused admission into hospitals for want of accommodation.

The *Modern Hospital Year Book*, 1930 gives the following table showing the distribution of hospitals and beds in the United States by classification:—

Classification of hospital	Total number of hospitals	Total number of hospital beds	Average Bed Capacity
Children ...	118	12,014	102
Skin & Cancer ...	25	1,567	63
Hospitals for convalescences and sanatoria	159	8,028	48
Eye, ear, nose and throat ...	66	2,829	41
Federal ...	252	59,141	231
General ...	4,925	361,079	73
Maternity ...	268	12,308	46
Mental and nervous cases	561	356,457	631
Prison ...	63	3,705	59
Tuberculosis ...	497	58,496	118
Contagious diseases ...	141	12,185	87
General hospitals and hospitals of allied institutions (Homes, etc.) ...	380	22,424	65
Homes for chronic invalids and incurables	51	4,488	88
Others ...	9	179	20
Total ...	7,515	914,900	1,672

In 1929, the total number of beds in hospitals for tuberculosis patients was estimated at 72,000, providing isolation and treatment for many thousand patients and, what is of equal if not greater importance, breaking the dangerous contacts with children in homes.

In Bengal we have only one private hospital for tuberculosis patients while there is accommodation for a small number of patients in the hospitals attached to the Calcutta Medical College and the Carmichael Medical College. The doors of the hospital at Itki in the neighbouring Province of Bihar and Orissa are bolted against Bengalees who are not domiciled in the Province though there is no such restriction in the Bengal hospitals.

When can Bengal hope to have about 3,000 hospitals?

About 1,800 hospitals in the United States had outpatient departments in 1929. In addition to these out-patient departments of hospitals there were perhaps approximately 5,000 unattached clinics, sponsored by various official and non-official health and social organisations, such as child-welfare clinics, tuberculosis clinics, venereal disease clinics, dental clinics, etc.

To realise the necessity of more hospitals in Bengal—one bed for every 100 of population—one need only study the Bengal Public Health Report.

What are the conditions prevailing in the Province?

In 1931, as many as 241,552 infants under one year, of whom 129,740 were males and 111,812 females, died. 57.3 per cent. of the total infant mortality was recorded among infants under one month, 26.7 per cent. among those between one and six months and 16 per cent. at the age of between six and twelve months.

47,359 still-births were registered during 1931, while 10,687 deaths from maternal causes were registered.

The following table shows mortality (per mille) according to age in 1931 :—

Under one month* ...	99.8	10 to 15 years ...	7.7
1 to 6 months* ..	46.4	15 to 20 ,, ...	12.8
6 to 12 ,, *	27.8	20 to 30 ,, ...	13.0
Under one year* ...	174.0	30 to 40 ,, ...	14.9
1 to 5 years ...	26.4	40 to 50 ,, ...	20.1
5 to 10 ,, ...	12.2	50 to 60 ,, ...	32.8
		60 years and above ...	78.4

In the year 1931-32, 195 boys' schools were visited by 41 medical officers who medically inspected 21,085 boys and also 817 girls in 7 girls' schools were medically examined. The results revealed a deplorable condition in the health of the boys examined :

(1) Physical condition—Out of a total of 21,085 scholars, 5,060 or 23.8 per cent. were badly nourished.

(2) Clothing—Out of a total of 21,085 scholars 4,950 or about 23.4 per cent. had very dirty and bad clothing.

(3) Height and weight—The average height of all scholars inspected at different ages compared favourably with the anthropometric standard while their average weight compared far less favourably with that shown on the anthropometric standard.

(4) Skin—1,443 or about 6 per cent. were affected with some kind of skin disease or other, mostly from ring-worm or scabies.

(5) Teeth—2,356 or about 11.1 per cent. had carious teeth.

(6) Nose—536 or about 2 per cent. were suffering from some kind of nasal disease, mostly rhinitis.

(7) Tonsils—3,345 or about 11 per cent. were suffering from enlarged tonsils.

(8) Adenoids—445 or about 2 per cent. were suffering from adenoids.

(9) Lymph glands—1,440 or about 6 per cent. had the lymph glands enlarged.

Per 1,000 birth.

(10) Ear conditions—400 or about 1.9 per cent. had ear troubles which, in most cases, consisted of otorrhoea.

(11) Heart—169 or about 0.75 per cent. had heart troubles.

(12) Lungs conditions—322 or about 1.5 per cent. were suffering from bronchitis. Besides these, there were 25 boys who were suffering from tuberculosis of the lungs.

(13) Enlarged spleen—914 or about 4.3 per cent. had enlargement of the spleen. Out of these, 25 per cent. belonged to the city of Calcutta.

(14) Rickets—47 or about .02 per cent. had rickets.

(15) Malaria—548 or about 2 per cent. were actually suffering from malaria during medical inspection or were convalescent from recent attacks of malarial fever.

(16) Dysentery—118 or about .5 per cent. had either dysentery during medical inspection or were recently convalescent from it.

(17) Eye trouble—The number of scholars found to have eye troubles was 2,803 or about 13.2 per cent. The majority of them were suffering from defective vision. Out of the total number 2,144 belonged to Calcutta. The refraction of students with defective vision was carried on by the Medical Inspector of Schools in the refraction room of the Calcutta Medical College Eye Hospital. In this clinic during 1931-32 the refraction of about 550 students were determined with the following results:—

Total number examined	550	No. of myopics	...	3
No. of hypermetropes	...	22	All other defects of	
No. of myopes	...	32	vision examined	...
No. of hyperopic				481
astigmatics	...	12		

(18) Total defectives—The total number of students medically inspected by Government School Medical Officer of Calcutta was 5,727. Out of them 1,993 or 34.8 per cent. were defective students. For the whole of Bengal the total number of actually defective students is not available, but among 21,085 students 5,715 or about 27 per cent. had so much defect as to require notification to their guardians.

No wonder, the boys when they grow up to be men do not enjoy perfect health.

To this must be added the fact that about 3 per cent. of the students examined had no marks of vaccination on their bodies, and were, consequently, susceptible to small pox.

Dai-training should be given more attention to. • And the strict administration of the Bengal Food Adulteration Act has become a necessity.

Successive Ministers from the late Sir Surendra Nath Banerjea to the Hon'ble Sir Bijoy Prosad Singh Roy have given the problem of water supply in rural areas their most anxious consideration and a scheme was prepared by the late Sir Provas Chandra Mitter in consultation with representatives of the District Boards. Unfortunately the funds at the disposal of the Government of Bengal have never been adequate for this and other works urgently needed, and the economic depression has hit the District Boards very hard financially. The progress of the work of making necessary provision for the supply of pure drinking water in the rural areas has been slow. It requires more money and more men. •

What local co-operation can easily do has been demonstrated time and again in various cases but nowhere more clearly than in the success of the experiment—small but significant—of flood irrigation in Midnapore, which has reduced the prevalence of malaria in the experimented area by the flushing of foul tanks and *dobas*. With the problem of water supply is bound up the problems of cholera, dysentery and malaria. Lord Ronaldshay calculated that malaria is responsible for 200,000,000 days of sickness in Bengal every year. In 1909 Lord Minto in welcoming the delegates from the various provinces to the Imperial Malaria Conference referred to the problem as one of "Imperial magnitude" and, after speaking of the number of deaths from malaria said, "Loss by death is by no means the whole of that evil. There are the cases of those who contract the disease but do not die, and the ratio of the number of such cases to the number of deaths is very high". Rural water supply must

be improved and malaria made to disappear from the countryside.

We have already got the Dufferin Victoria Zenana Hospital in Calcutta ; its establishment was the inauguration of a new and wholesome departure from neglect and apathy in the matter of providing medical relief to those women whose prejudice against and aversion to modern medical and surgical methods of treatment have not yet been completely overcome. We have the School of Tropical Medicine where researches connected with diseases peculiar to tropical countries—and leprosy is one of them—are being conducted. We have, thanks to the laudable efforts of private practitioners and philanthropic organisations, Kala-azar centres where very useful work is done. The number of hospitals in Calcutta and all over Bengal is on the increase and is due to the devoted services of individuals. Bengal has not only produced great physicians and surgeons but also men like the late Dr. R. G. Kar, the builder of the Carmichael Medical College with its attached hospitals who, so to say, dedicated himself to the work of the institution when he lived and, when he died, left his all to it. Medical men and members of the lay public have now warmed to the task of helping hospitals and charitable dispensaries. The sanitary conscience has been awakened and promises to usher in a new era.

The indigenous systems of treatment which had been suffering from neglect due to inferiority complex and other causes are once more raising their heads and coming forward to contribute their quota to the general stock of human knowledge which is being constantly enriched for the benefit of the suffering humanity. The reverence which is the product of knowledge has made European Doctors examine the gifts which these indigenous systems can bring. A great Surgeon-General like Sir Pardy Lukis had no hesitation in admitting with courage born of conviction : "The longer I remain in India and the more I see of the country and the people, the more convinced I become that the methods of treatment adopted by Vaid and Hakims are of the greatest value and there is no doubt whatever that their ancestors knew, ages ago, many things, which are

now-a-days being brought forward as discoveries". Just as the West cannot ignore the contribution of the East to the medical science so the East cannot be blind to the marvellous progress of the West in research work. A better understanding between the various systems is now possible and the present popular Minister in Bengal is the fittest person to facilitate that understanding which is sure to result in untold good to mankind.

What permanent improvement in the economic condition of the Province can be achieved with death casting its shadow over it and disease sapping the vitality of the people? Poverty and pestilence, disease and destitution move in a vicious circle. Surely a leading cause of poverty and of many other disagreeables in Bengal is the prevalence of diseases to which can be traced the cause of the Bengalee's lack of energy. But as "man can half control his doom" so he can also change the condition of his environments. He must cultivate the will to conquer and not to be conquered, to utilise the elements and not to succumb to their subtle influence. Hope should be his watchword and he will in no time infuse new life where desolation prevails.

The combined action of the Government and the people, by harnessing science to the service of man, can easily bring about the desired change in the health of the people. The birth of a new nation in Bengal is the end we have to achieve and achieve it we must.

CHAPTER XXIII

CONCLUSION

Having attempted to adumbrate and advance a scheme, which by no means we claim to be perfect, for the development of Bengal, we would like to visualize the scheme in actual work.

The vast majority of the people of the Province, as of the whole country, must depend on agriculture for a long time yet ; the prosperity of the Province is closely bound up with the prosperity of its agricultural industry. And one of the most important conditions upon the fulfilment of which agricultural prosperity depends is, as the Wembley Resolution (1924) aptly pointed out, the application of scientific knowledge, under the guidance of the State, to the farming industry. We must develop agriculture on modern lines, utilising the experience of all countries and harnessing science to its service. Soil survey and level survey should be completed with the least possible delay. The agriculturist should be encouraged by demonstration, even more than by advice, to concentrate on crops for which the local soil is congenial. Irrigation works should be taken in hand. The results of research and experiment, information about demand and supply, crop and weather forecasts, news about markets—prevailing and prospective, all these must reach the agriculturist in his village home. These should radiate from a central organisation and reach the village through the District, the Sub-divisional and the local organisations, in every case the existing Union Boards of which we have at present over 4,500 being the unit of the villages and the last link in the chain connecting the cultivator with the central organisation. The local organisation should be located at the headquarters of the Union Board which is generally the most important of the villages which constitute the Union.

For every group of villages we should have an Agricultural

Bureau with different departments. The Store Department would be divided into two sections, the "give" and the "take" sections. The "give" section will stock improved seeds, artificial fertilisers for the various crops grown in the villages, and mechanical appliances for agricultural purposes. For the first year these would be supplied to approved agriculturists on proper security, preferably through a Co-operative Credit Institution. In our chapter on agriculture the manifold advantages of mechanical appliances have been described. The small size of the average farm precludes the possibility of the individual cultivator maintaining these appliances and it may be necessary to give them to the cultivators on hire or to allow a group of cultivators to acquire them as joint property. The section will get its supplies from the central organisation which will purchase them wholesale, through the District and then the Sub-divisional organisation.

To the "take" section the agriculturist will bring his produce for disposal. The officer-in-charge should be in direct touch with the market through the District and Sub-divisional organisations and would take the produce and grant the agriculturist a receipt for it on which he will state the value of goods delivered.

This receipt will have to be taken to the finance or banking section which will deduct the dues to the "give" section and pay the agriculturist 80 to 90 per cent. of the balance.

When the goods are sold the amount due to the agriculturist, minus a small commission charged for the running of the organisation, will be credited to his account with the "give" section for payment for the next season's supply of seeds, fertilisers, mechanical appliances, etc.

The "take" sections of all local organisations will be in constant correspondence with one another with a view to facilitate the work of grading and bulk handling of goods which, after meeting the local demand, will be sent to the Sub-divisional organisation Store for local sale and transmission to the District Organisation.

The intelligence section will be ready with every necessary information for the enquirer.

Last but not least in importance will be the demonstration section with its maps, charts, samples, the magic lantern and the portable bioscope with specially prepared films.

It was a brilliant idea to send out the Touring Exhibition Van to give lessons, chiefly by means of ocular demonstration to the villagers in matters connected with public health and the industries. Such vans would prove very useful for propaganda and demonstration work, and should be fitted up by the Sub-divisional organisations to be placed at the disposal of the local organisations by rotation. These vans will open up a new world, so to say, to the villagers and teach them how to improve their crop, their cattle and their financial position. It will throw on the screen maps showing the distribution of crops as it is and as it should be.

Needless to say that for re-organising the distribution of crops the first thing necessary would be a careful soil survey by the Government Department which will supply the information, *i.e.*, the result of the Survey to the central organisation from which it would filter down to the local organisations—every such organisation receiving the information necessary for the locality it will cater for.

Wireless should be fitted up for every local organisation for broadcasting commodity prices, anticipated market conditions and weather forecast. A proposal has been made to try the experiment of extending the radio to some centres within a distance of one hundred miles from Calcutta. This scheme should be extended.

The necessity for propaganda and demonstration in a Province where about 93 per cent. of the population live in villages and the percentage of literacy is negligible cannot be over-estimated. In addition to sending out Exhibition Vans, exhibitions should be organised every year in the local organisation centres for instruction with amusement.

Scientific investigation, research and experiment have

worked wonders in improving agriculture in Europe and America. Bengal should not lag behind.

To every local organisation should be attached a charitable dispensary run on what is generally called the "Nadia system" under which the patients should pay a small fraction of the cost of medicine which would go a long way to reimburse the dispensary. More than ten years ago the Bengal Legislative Council accepted a resolution that a charitable dispensary should be established at every police station. But it is regrettable that it has not yet been found possible to give effect to it because Bengal has not been given enough to undertake comprehensive schemes of improvement.

Nor should the health of the cattle be neglected. The importance of cattle in the economic life of the people is evident and under-fed and uncared-for cattle, often enjoying the forlorn freedom of neglect, is wealth wasted. The animals are not only used for agricultural purposes but for dairy farming also. Their improvement should be a matter of concern and for a group of local organisations we should have one veterinary dispensary stocked with vaccine and serum for diseases like foot and mouth, reinderpest, etc., under a qualified doctor trained in the Bengal Veterinary College. Every local organisation should introduce breeding bulls from good milking strain and encourage breeders of stock to maintain them. Dairy farming should be encouraged and marketing facilities secured for dairy produce.

Poultry farming should be developed. If good cocks are introduced and the eggs purchased according to weight for transmission to the market, poultry farmers will learn to understand the value of good birds. The stores should be in a position to supply incubators as soon as the poultry industry develops to some extent.

Bengal is a land of waterways and pisciculture is an ancient industry in the Province. But science has not been requisitioned to its help in Bengal ; nor have experiments been made to develop it. Here also demonstration is necessary,

even more necessary than any other form of propaganda. As in Madras, trained men should be sent out to visit the centres of the industry where there are colonies of fishermen to teach them improved methods of pisciculture, while the Government Department should study the habits of the various kinds of fish that are available in our waters and devise means for their breeding. •

Like the soil survey, level survey also should be carefully concluded with a view to introduce improved methods of irrigation. The various forms of irrigation—flood, tank, well—should be carefully studied and undertaken. • Old and silted up channels should be cleared, sedges and the blue devil got rid of, and water made to flow along the beds. Where this is not possible tank irrigation should be encouraged and the usefulness of modern pumps demonstrated. Well irrigation cannot be neglected, specially when the tube-well has ensured a constant supply of water not only for drinking purposes but also for use in irrigation. In the matter of irrigation Bengal has been sorely neglected. Of the total area irrigated by Government works in India, only a small fraction belongs to Bengal. In comparison with other provinces, specially the Punjab, Madras and the United Provinces, her achievements in this direction are negligible.

The programme that has been put forward for agricultural improvement would apply to industrial development. Without prosperous industries there can be no hope of all-round national progress. The Department of Industries should be constantly engaged in improving methods of production and devising labour-saving appliances and machinery and in discovering new alloys and cheaper substitutes for the raw materials in use. The results of their enquiries and experiments should be made known to the Central Organisation in Calcutta and should reach the centres of industry through the District and Sub-divisional organisations. The Central Organisation should purchase raw materials for the industries and supply them, according to requisitions, to the District Organisations which would follow the same process to supply the Sub-divisional

Organisations through, which the local organisations would be supplied.

The local organisations would have their centres in colonies of workers and, would be divided into "give" and "take" sections, the banking or financing section and the Information Bureau.

The Industrial worker will get his supply of raw materials from the "give" section and bring his finished product to the "take" section, which will arrange for the marketing of the products as in the case of the agricultural products.

The agricultural organisation and the industrial organisation will be two parts of one scheme ; and by their joint operation will be built up a brighter, a happier and a more prosperous Bengal from which will be banished poverty and its concomitant evils—including unhealthy conditions and ignorance, pestilence and vice—those fat maggots and creeping parasites that breed in poverty.

A reconstruction of social life in the countryside with a view to remove the disparity between the attractions of the town and the country is urgently called for. The improvement of conditions prevailing in the countryside will require expenditure of large sums and the question necessarily arises as to how these operations will be financed. It is a counsel of perfection that rural reconstruction should be made self-supporting. But as it is, this must be considered to be far from practical. When we think of rural England with its motors, telephones, wireless, daily press, post and telegraph offices in every village and weekly markets in all the rural towns can we say that in India people in the rural areas must pay for the good things they want. We are of opinion that before we ask rural people to pay for the good things they want we must enable them to pay, in other words, their spending power must be increased. Mr. F. L. Brayne has said that the rural problem is the biggest problem in India, and the rural problem extends over the whole of village life. "After a century of industrial development in England, largely at the expense of agriculture and of the village so that the countryside was coming to be regarded by

the average townsman as merely the playground of the urban workers, a change of outlook is beginning to be apparent here to-day. The more thoughtful of our town-people have begun to realise that the decay of the countryside must in the end spell the ruin of the whole country, and a very definite effort is now being made with increasing success to restore the countryside to its proper place in the commonwealth".

But India has not England's immense reserve of industrial prosperity to fall back on to recreate the ideal countryside. And we must fall back on the help of the State. In the words of the Royal Commission on Agriculture in India we have got the needs specified :

"If the inertia of centuries is to be overcome, it is essential that all the resources at the disposal of the State should be brought to bear on the problem of rural uplift. What is required is an organised and sustained effort by all those departments whose activities touch the lives and the surroundings of the rural population".

Fortunately for Bengal that has been the declared policy of the Government of the Province, as will appear from the Press Note issued by the Government on the 22nd February, 1934, on the creation of the post of a Rural Development Commissioner to carry out a policy of rural reconstruction in the Province.

The financial injustice done to Bengal under the Meston Settlement was colossal. Protests against the Meston Settlement were lodged by various individuals and associations in Bengal, but nowhere was the tocsin of alarm more clearly sounded than in the Memorial submitted by Sir P. C. Mitter, on behalf of the National Liberal League. He pointed out how the provincial administration of Bengal had been starved for a long series of years as compared with the other important Provinces. "The Provincial expenditure of Bombay according to the Budget Estimate of 1919-20 was Rs. 10,50,00,000 that of Madras Rs. 9,60,00,000 that of Bengal Rs. 7,77,00,000 and that of the United Provinces Rs. 8,61,00,000. The population of Bengal is more than double that of Bombay, larger than that

of Madras and alightly less than that of the United Provinces. It ought also to be remembered that the heavy Imperial taxes which are raised within the limits of Bengal make the Bengal administration necessarily more expensive The notoriously insanitary condition of malaria-stricken Bengal, the contribution of over Rs. 6 crores to the Government of India from the export duty and income-tax on jute, jute manufacture and jute business from that Province and the fact that millions of jute-growing raiyats of Bengal are the worst sufferers from malaria and that jute is by no means a negligible contributory cause for the spread of malaria are factors which ought to arrest the forcible attention of the Government of India and of all right-thinking persons as to the past neglect of sanitation in Bengal."

He submitted that the whole of the export duty on jute ought to be surrendered to Bengal. "Jute is one of the few commodities on which there is an export duty and the entire amount of such duty was in the past wholly taken by the Government of India. Not only is there this export duty on jute but the Government of India has realised in the past and will continue to realise in future large sums of money in the shape of Income Tax raised from jute manufacture and jute business. It appears that there is no export duty raised from many of the important commodities in which other Provinces are interested, e.g., raw cotton (total value of export, 27 millions and odd) grains, pulse and flour, excluding rice (13 millions and odd) seeds and copra (17 millions and odd), etc. As the other Provinces do not contribute any export duty on export in which they are interested and as jute is a monopoly of Bengal and as the cultivation of jute is responsible, to some extent, for the spread of malaria in the Province and as it is impossible for Bengal to carry on her ordinary expenses without the whole of the jute export duty being assigned to Bengal, my council begs to submit that the said duty ought to be so assigned".

The result of the Meston Award was that in the Budget of the Government of Bengal for the year following the

introduction of the Montagu-Chelmsford Reforms there was a deficit of about 2,15,00,000. In moving a resolution in the Legislative Assembly to remit the Provincial Contribution of Bengal Sir Malcolm Hailey said (September, 1921):—

“We (the Government of India) have examined the case, both narrowly and critically, and it appears certain that with every economy Bengal must have a deficit of not less than Rs. 120 lakhs. Even if we made no allowance for any extra expenditure for improvements in transferred subjects, such as are desired by Ministers, improvements which we are told, are necessary if the Reforms are to be a success, Bengal would have that deficit even if it provided only the bare minimum expenditure required to carry on the ordinary administration of the Province”.

That the remission of the Provincial contribution in 1922 did not meet the situation in Bengal will be evident from the table given below :

Year	Revenue	Expenditure	Surplus+ deficit—
1921-22	... 8,32,44,000	10,47,91,000	— 2,15,46,000
1922-23	... 9,84,96,000	9,59,21,000	+ 25,75,000
1923-24	... 10,13,17,000	9,77,95,000	+ 35,22,000
1924-25	... 10,34,24,000	9,76,02,000	+ 58,22,000
1925-26	... 10,70,17,000	10,30,63,000	+ 39,54,000
1926-27	... 10,50,36,000	10,90,95,000	— 40,59,000
1927-28	... 10,81,29,000	10,85,57,000	— 4,28,000
1928-29	... 10,98,67,000	10,90,47,000	+ 8,20,000
1929-30	... 11,35,87,000	11,33,49,000	+ 2,38,000
1930-31	... 9,66,26,000	11,40,78,000	— 1,74,52,000
1931-32	... 9,01,06,000	11,00,52,000	— 1,99,46,000
1932-33 (Reviewed)	9,42,73,000	10,82,21,000	— 1,39,48,000
1932-33 (Budget)	... 9,11,53,000	11,30,63,000	— 2,19,10,000

As has been pointed out in a Bengal Publicity Board pamphlet, “the small surplus for the few years from 1922-23 was due to new Provincial taxation—a contingency which the Meston Committee had regarded as ‘unthinkable’—on amuse-

ments and betting and increase in the fees on general and court-fee stamps and to enforcement of utmost economy in administration. The taxes on amusements and betting alone yielded Rs. 5,37,000 and Rs. 14,44,000 respectively in 1925-26''.

No wonder, the Settlement has a crippling effect on the progress of the Province. The following figures taken from the Simon Commission Report show the expenditure per head of population according to 1929-30 Budget estimates (in rupees) :

	Madras	Bombay	Bengal	U. P.	Punjab	Burma	B & O.	C. P.	Assam
Education ..	608	1057	285	421	806	962	262	410	421
Medical and Public Health	333	472	210	145	391	492	153	158	289

The figures for transferred services in the three principal agricultural provinces and the two chief industrial provinces were as follows :

Expenditure in lakh of rupees :

	1922-23	1929-30	Increase	Percentage Increase.
Madras ...	411.3	763.8	352.5	86
Punjab ...	299.0	542.7	243.7	82
United Provinces ...	298.0	388.2	90.2	30
Bombay ...	453.5	567.6	114.1	25
Bengal ...	353.9	404.0	50.1	14

The disparity here revealed is equally noticeable when the figures of expenditure on the principal nation-building services are examined separately :—

Percentage increase between 1922-23 and 1929-30 :

	Education	Medical relief and public health.
Madras ...	82	115
Punjab ...	78	94
United Provinces ...	47	67
Bombay ...	23	43
Bengal ...	21	24

It does not take one long, after one has examined the tables, to understand why it has been impossible to inaugurate comprehensive schemes of public service in Bengal and realise the difficulties under which the Government have been constrained to carry on their work.

The position was admirably presented to the local Legislative Council by His Excellency Sir John Anderson when he explained the difficulties of Bengal in effecting further economies by retrenchment.

"Bengal's standard of expenditure," he said, "has always been low. In 1929-30, the last normal year before the advent of the present depression, the expenditure per head in Bengal was the second lowest in India, the only other Province with a lower standard of expenditure being our neighbour, Bihar and Orissa." Bengal's expenditure per head in 1929-30 was as low as two and a half rupees while the figure for Madras was just over four rupees and the figure for Bombay eight and a quarter rupees.

Want of funds has resulted in our being unable to show some result in improving the condition of the Province—in placing a new milestone on the road of progress. On the other hand it has impaired the efficiency of the administrative machine.

In this matter the Government of Bengal deserve the gratitude of the people for the fight which they, backed by the people of the Province, have put up and continued during all these years. The battle has been but half won. In the last Budget (1934-35) the Government of India had, in recognising that some special help to Bengal was necessary, and that immediately, made the "provisjonal" arrangement to hand over "half the jute export duty to the jute-producing provinces". The action on the part of the Government of India was on the lines suggested in the Parliamentary Propopsals for Indian Constitutional Reform (1933) generally known as the White Paper. The Paper proposes that in the allocation of revenues—

(a) "Of export duties on jute or jute products, an assignment to the producing units will be compulsory, and will amount to at least 50 per cent. of the net revenue from the duty".

(b) Not less than 50 per cent. and not more than 75 per cent. of the Income Tax (less taxes on the income or capital of companies and Corporation tax) will be assigned to the Provinces, but out of the distributable share a prescribed amount, called "block amount" will be kept by the Centre which will be extinguished in ten years.

But this cannot satisfy Bengal. The allocation of only 50 per cent. of the proceeds of the export duty on jute will merely enable the Government of Bengal to balance their budget, *i.e.*, to save them from piling up their debts to figures which would become unmanageable, but will not really raise the Government's standard of expenditure, nor make it possible for them to secure the large sums necessary for reconstruction work. We quote with approval the comments of the Hon'ble Finance Member on the point :

"It can be argued that, as in the United States of America, export duties should not in a Federation be a source of Federal revenue because of the danger of the imposition of differential taxation on the inhabitants of certain parts of the Federation in favour of the rest. An export duty on an article which enjoys an assured market and is produced in a strictly limited geographical area, imposed centrally for the benefit of that area, stands, however, on an entirely different footing. We see no reason, therefore, why the proceeds of such an export duty should not be treated differently from an import duty. . . . We have protested against the retention of any part of the export duty on jute as a Federal source of revenue on the ground that it involves differential taxation of the inhabitants of Bengal and the other two jute-producing Provinces in favour of the rest of India."

Coming to the proceeds of the Income Tax we find that the Tax collected in the Provinces in 1929-30 was as follows :

		In crores of rupees
Madras	...	1.41
Bombay	...	3.69
United Provinces	...	0.90
Punjab	...	0.64
Bengal	...	6.18
Total of all provinces		17.06

About 36.2 per cent. of the total Income Tax raised in India, therefore, came from Bengal. So it is desirable that a substantial portion of the Income Tax should be available to the Province and that the methods of distribution should not be based on the population of the different Provinces but should bear a close relation to the actual amount received from each Province.

Money must be found by the Government for the purpose till the spending power of the people is increased when fresh taxation may be possible.

These and other cognate matters demand careful consideration. Without in any way minimising the utility and importance of the Board of Economic Enquiry formed by the Government of Bengal we would recommend the appointment of a Supreme Council of, say, four experts who should be entrusted with the work of considering the various problems connected with the work of economic development and allied subjects. The best men available should be selected to serve as wholtime officers on an adequate salary, the term of appointment being fixed ; but the retiring officer should be eligible for re-appointment. We want to limit the membership to four because we want this small and compact body to be composed of the Development Commissioner, an expert in Agriculture, an expert in Industrial methods and an expert in Banking and Commerce so that every necessary department may be adequately represented.

The Board of Economic Enquiry referred to above has been constituted with the following objects :

(1) To conduct enquiries into such economic matters as may be referred to it by the Local Government, and

(2) To initiate and conduct, subject to the sanction of Government, enquiries into other economic matters (other than those referred to by Government).

It is a representative body and as such has many advantages and numerous limitations. In opening the proceedings of the first meeting of the Board His Excellency Sir John Anderson explained what the Government expected from that body. Said His Excellency :

“You have been brought into existence in response to a public demand—a demand expressed largely through the Chambers of Commerce. Through you the Government hope to be able to receive the benefits of the knowledge and experience which many of you command in the different spheres of the economic life of the Province.

“You are not an executive body. Your function is deliberative, there will be ample work for you to do”.

The Supreme Council, we propose, should not be a merely deliberative body. It may be remembered that in 1931 Sir Arthur Salter, who was then Director of the Economic and Financial Section of the Secretariat of the League of Nations, visited India. He prepared a scheme for an Economic Advisory Organisation in India and recommended that in addition to a Central Economic Advisory Council, there should be an Economic Council in each Province.

In December, 1932, the Bengal Chamber of Commerce suggested “a general survey of the position in Bengal with a view to reaching some broad plan to form the basis of future policy”. With businessmenlike precision the Chamber suggested the creation of a Council of experts rather than of a representative nature. Following the Bengal Chamber's example the Bengal National Chamber of Commerce submitted a very thoughtful memorandum laying down the lines of action on which, according to it, enquiry should proceed. An excellent memorandum was also submitted later on by the Indian

Chamber of Commerce which not only recommended the creation of a Development Department under a Minister controlling the Departments of Agriculture, Industry, and the Co-operative Movement with an Advisory Council but also defined the functions of the proposed Department. The necessity of economic planning has been recognised in India both by the Government and by the people. The Government have already appointed Committees for the purpose while the question has loomed large in the addresses of the Presidents of various economic and mercantile bodies.

Economic planning has been resorted to in various European countries. The necessity of an economic plan for England was stressed as early as in 1930 by Mr. Churchill in one of his characteristically strong utterances :

“The nation is not interested in politics, it is interested in economics ; what it asks for is more money, better times, regular employment, expanding comfort, and material prosperity. It complains that the phenomena of production, consumption, and employment are at this time in our country ill-related. It turns to Parliament asking for guidance, and Parliament, though voluble in so many matters, is on this one paramount topic dumb”.

He saw no reason why the Political Parliament should not choose in proportion to its party groupings a subordinate Economic Parliament of, say, one-fifth of its members, and composed of persons of high technical and business qualifications. This idea, he pointed out, had received much countenance in Germany. There was no reason why such an assembly in England should not debate in the open light of day, and without caring a half-penny who won the General Election, or, who had the best slogan for curing unemployment solve the grave economic issues with which England was confronted. There was absolutely no reason, said he, why the Economic Parliament should not, for the time being, command a greater interest than the Political Parliament. Trained in the traditions of Parliament Mr. Churchill suggested an additional

Economic Parliament. It is only another name for a Planning Board—a Supreme Council—benefiting by the co-operation of the best brains in industry, trade unions, and working in conjunction with the Ministers—more capable and certainly better fitted to guide the economic and commercial affairs of the country than an agglomeration of hundreds—Members of Parliament many of whom apart from rhetoric and oratory, have very little knowledge, either intimate or general, of the great basic industries of the country.

A plan to be effective must take note of two issues :

(1) Political

(2) Industrial and Commercial Organisation.

The Political issue, according to Harry Edmonds, the author of *A British Five-Year Plan*, of paramount importance to the nation is briefly as follows : "The nation's share of a vast amount of capital, when free circulation is indispensable in restoring contentment and happiness, is, by some means, by some people, or by some methods, being held inert and useless. There is no doubt whatsoever that the mass of the people wish this situation to be corrected".

This is amply proved by the latest report of the Controller of Currency in which it is stated that altogether about 23,435,867 ounces of gold had been exported from India in the last three years and it was approximately 47 per cent. of the gold imported since 1920-21. "If allowance is made for the very large imports of gold prior to 1920-21 it is obvious that only a small fraction of India's total gold holding has been released so far". India then had a large reserve which lay inert and useless. How to make it productive should be one of the important problems the Council should have to solve.

The question of currency is outside the sphere of activity allotted to the Provinces. But an important body like the Council will surely get a hearing on this intricate problem. For, the question of currency is intimately connected with the question of economic development.

For recovery, we want planning and to render planning effective, we must consider the monetary question not only in

relation to internal matters but also in relation to the outside world. The disturbing factors must be minimised if they cannot be eliminated altogether. The tools to combat them are well-known. As F. W. Pethick Lawrence has put it, "there are four principal tools : (1) The control of the currency ; (2) the creation of credit ; (3) the determination of the price of credit ; (4) the furtherance of Public enterprises on borrowed money".

The question of the stability of the price level must engage the attention of the Supreme Council. "The staple articles of everyday use play so large a part in the lives of every one who shares a common civilisation, and so inter-related are all human needs that if the price of a fully representative group of them be stabilised the price of another group is likely to be much more nearly constant than if the unit of value be tied to a single substance such as gold". Previously this was the case and the gold standard was not only considered sacrosanct and a badge of financial aristocracy but also a necessity. Post-bellum conditions have pricked this bubble and the theory which had given currency to this belief in the superiority of the gold standard has been exploded. England and other European countries are now off the gold standard. In December, 1932 the English pound could buy between three and four times as much in wholesale goods as it bought in March 1920. And in America similarly the dollar could buy in wholesale goods in 1932 two and a half times what it could in 1920. Artificial price cannot be stable nor the unit of value. Among the elements which conduce to stability are the standard units of length, weight and volume to which we have become used. But the unit of money is still more important than the units of length, weight or volume. Fluctuations in price are a double danger. When prices fall we usually take into consideration the static loss only, i.e., how we are hit when falling prices reach the lowest level. But there is the dynamic loss also, i.e., the loss which has to be suffered when prices are in the act of falling. No amount of "adjustment" can neutralise this dynamic loss which tends to paralyse manufacture threatening to bring about a condition in which no business is possible.

The "constant purchasing power of the currency" may be an ideal but impossible condition ; but human effort, specially action of Government, can minimise the fluctuation not so much by a "controlled currency" as by adjusting price levels, by devising means by which the rise or fall in the price of manufactured articles may be in unison with the rise or fall in the price of agricultural produce. The more a country is self-centred, i.e., the less it depends on foreign supplies the more is this possible. How to make the Province more self-centred and how to reduce the gap between the price of agricultural products and manufactured articles must be one of the important problems which the Council will be called upon to solve. This cannot be done by deliberative representative organisations but must tax the ingenuity of experts, whose services must be requisitioned by Government.

What has been said before may require a little expanding. Let us take the case of the agriculturist who requires clothing for himself and galvanized iron sheets for his house. If, when the price of rice was Rs. 4 a maund the price of his clothing was Rs. 20 and that of the iron sheets Rs. 40, he could obtain both by selling, i.e., giving in exchange 15 maunds of rice. But when the price of his produce goes down by 50 per cent. and the price of the two articles he requires by only 10 per cent. he has to pay Rs. 54, i.e., to sell not 15 but 27 maunds of rice. The difference is distressing. The only way out of the difficulty is to reduce the gap between the price of the agricultural produce and the finished articles, in other words, to reduce the price of the finished articles, and raise that of the agricultural produce, as much as possible. This is not impossible but can be done only by careful planning. This planning will require the services, tax the intellectual resources and demand the utilisation of the accumulated experience of experts who should devote their time to the task.

Up to now we have discussed the obvious duties of Government and they are certainly intricate and difficult involving large sums of money which will have to be found, as also

brains, energy and goodwill of all their servants. But there is another party to the important work,—the party even more interested in it—the people.

If money is found, and His Excellency Sir John Anderson has definitely pronounced and promised “it *will* be found” for money spent for the purpose “with the assured co-operation of leaders of opinion will be money well spent, bringing an adequate—indeed an ample return”—without men it would be almost useless. Only the energy, the enthusiasm and the earnestness of the people can make the withered sticks of rules and regulations blossom forth into a national undertaking. The Government can supply the sinews of war but not the driving force. They can draw up the programme but cannot infuse the enthusiasm. The problem surely is not one for Government alone. “If an effort is to be made worthy of the occasion and equal to the crying needs of the situation, the best elements in the community must be harnessed to the task”. It will, as His Excellency Sir John Anderson has put it, call for organisation, for personnel both paid and unpaid.

France has launched its five-year plan and hopes that, as its result, at the end of five years France will have a new network of good roads, her countryside will be almost completely supplied with electric power, and schools will be established and even the smallest communities will have modern sanitation and water supply. Why should it be impossible to do this in Bengal? So long financial facilities had been almost non-existent. That difficulty the Government is now determined to overcome. The people will surely come forward to supply the necessary energy and devotion to work—work necessary to create new conditions in Bengal under which instead of a dismal hand-to-mouth existence we shall be able to look forward to a bright and prosperous future for the Province. Let us hope, we have not been—during the last half a century—repeating without significance the words of A. O. Hume—“By themselves are nations made”.

In 1907 Lord Minto said that the Government of India would be blind to shut their eyes to the “awakening wave

which is sweeping over the Eastern world, overwhelming old traditions, and bearing on its crest a flood of new ideas". The Government of India admitted that its flow could not be checked.

A new chapter opened with the introduction of the Montagu-Chelmsford Reforms and they were introduced at a time when the scars of the Great War had not healed up. In opening the Legislature under the new constitution H.R.H. the Duke of Connaught took stock of the conditions then prevailing and remarked, "A contagious ferment of scepticism and unrest is seething everywhere in the minds of men ; and its workings are plainly visible in India". It is still visible and we appeal to our countrymen in Bengal to make this unrest productive by transferring their activities from the barren path of destruction to the road of constructive work for the amelioration of the condition—moral and material—of our countrymen ; political progress will follow, for, when a nation becomes self-reliant no one can set a limit to its ambition. We appeal specially to our young men and young women. To-day the flowing tide is with them. They can, if they only strive, recreate Bengal. The deserted countryside, the disrupted social organisation and the decaying industries, all demand their attention ; for, the touch of their magic wand—the magic wand of youthful enthusiasm can once again restore them to glory. They alone can make happy a people, distracted by poverty and steeped in ignorance. Impatience and idealism need not be productive of despair. It is folly to give up the attempt to work for the progress of the Province and the people because the way is long and the work achieved seems to have been insignificant.

"For while the tired waves vainly breaking
Seem here no painful inch to gain,
Far back, through creeks and inlets making
Comes silent, flooding in the main".

New ideas have emanated from new conditions and we want earnest workers who will work with the zeal of missionaries and turn into reality what may appear at first sight like a dream. It is not for man really to shape his dreams to fit the world

he finds "but to rebuild the world to fit his dreams". The dreams of generations of our poets and patriots require to be turned into reality and it is for our youths to take up the work.

We take this opportunity to appeal to those of our young men who have taken to the path of violence which has cast a gloom over the Province, a gloom which has been thickening for years much to the discomfiture of all those who have the ordered progress of the country at heart ; we would seriously appeal to them to pause, think and weigh in their own mind, as to whether or not they should transfer the talent which, as His Excellency the Governor has said, "is now applied in attempting to frustrate the policy of Government" from the perilous path of murder and revolution on to a healthy and peaceful track of economic reconstruction and development ; we would ask them to seriously digest the number and variety of openings suggested in this book and see for themselves if they cannot help to create a new order of things for the benefit of 52½ millions of Bengalees and thus rid the Province of the canker of terrorism which is slowly eating up the delicate moral fabric of our ancient society which has at its foundation a will to do good, and above all, a tender regard for all. The Province and the people require their services. We appeal to them to direct their talent into constructive channels and help us to accomplish the work outlined in this volume—work which is of immense importance in the matter of building a nation.

Towering over the contending creeds of India to-day stands a new creed—the creed of the Mother we worship, the Mother who is not only the mother of the Hindu or the Moslem or the Christian alone, but the mother of all the children of the land we live in—irrespective of caste or creed—the Motherland with

"Her splendid streams, her glorious trees,
The zephyr from the far-off Vindhyan heights
Her fields of waving corn".

We have a common duty towards her and the consciousness of that common responsibility should engage us in the work of reconstruction and development which must be considered alluring and glorious. The ideal of the Athenians as described by Pericles

should be adopted. "We at Athens", he said, "are lovers of the beautiful, yet simple in our tastes ; we cultivate the mind without loss of manliness." The question of sanitation and hygiene must be taken up as earnestly as the question of education. There is no lack of work—urgent and useful—for a self-reliant and self-respecting people. Education, sanitation, industrial development, the establishment of information bureaux and co-operative organisations, these and hundred other kinds of activities are waiting for our young men. These are the steps, steep but not insurmountable, that lead to the summit of Sumeru where rests the golden star Swaraj. It is for us, Hindus and Mahomedans of Bengal, to combine and cast away our old rags of communal wrangles and prejudices and racial hatred. And when the sacred words of *Bande Mataram* have joined together the *Gayatri* and the *Kalma* let us, to the measured music of this soul-stirring song, march onward towards the goal of self-realisation. In the sublime closing words of the second *Inaugural*—"with malice towards none, with charity for all, with firmness in the right as God gives us to see the right, let us strive on to finish the work we are in". The way may be long and the march arduous but the reward is glorious. No difficulty should deter us from the work, no danger should make us quail before it, no act of violence should ever bring a blot on our character, no injustice should defile the temple we worship in. This is the ideal which our young men and young women should accept. Braced with the golden shield of courage, helmeted with patience, armed with the sword of faith, let us proceed to work up to this ideal. Its realisation will demand sacrifice and we must be prepared to make it. Let us be ready for suffering and sacrifice, if need be, but have faith in our work and the end will be achieved—the enthusiasm and energy of youth will triumph—as it is bound to triumph.

APPENDIX

APPENDIX

SUPPLEMENTARY NOTES ON DEBT CONCILIATION

Method of Procedure for reconciliation of Debts

It is agreed on all hands that the indebtedness of the rural population is unbearably heavy and should be reduced, if not entirely removed. And there are valid reasons for such drastic measures. Since 1930, there has been a steady decline in the general price level which means that the purchasing power of the currency has correspondingly increased.

Year	Prices	Year	Price
1913	100	1931	96
1924	173	1932	91
1926	148	1933	87
1928	145	1934 (June)	90
1930	116		

The *raiya*s borrow generally for two distinct purposes, (1) for purchasing land and implements and for effecting improvements of the holding, and (2) for consumption purposes, which includes expenses for social and religious ceremonies, payment of rent, etc., and for building houses, etc.

It is difficult to state, with any pretension to accuracy, the proportions of these two kinds of loans in the total indebtedness. From the evidence submitted to the Bengal Banking Enquiry Committee, it appears that of the total rural indebtedness, about 65 to 70 per cent. was for purchase of lands and for other capital expenditure while the balance 30 to 35 per cent. was for consumption purpose. The exact determination of these proportions is, however, immaterial, because if debt conciliation is decided upon, the work will undoubtedly be entrusted into the hands of institutions or organisations having knowledge of local affairs and they will easily be able to find out the nature of the debt in individual cases.

When an agriculturist contracts debt for purchasing land or for incurring capital expenditure in connection with the land, he naturally expects that he will be able to repay the debt from the income of the land. If prices of agricultural products decline, naturally he gets less in currency for his produce. The value of the land also diminishes. It is, therefore, only equitable that the burden of the debt should be

reduced in the same proportion. This should be more so in those cases where the interest has been paid regularly, because the falling prices made the real burden of the already high interest rates in such loans heavier still. The present value of such debt can be easily calculated in the following way :

If p_1 is the price level (*i.e.* the index figure) of a particular commodity for the cultivation of which a certain amount of debt was incurred (Jute, Rice, Oilseeds, Pulses etc.) and in the year when such debt, say, X was contracted and p_2 the price level of the same commodity in the year in which conciliation will take place then the actual value of the debt X_1 will be given by the simple formula

$$X_1 = X \cdot \frac{p_2}{p_1}$$

The price levels of the various commodities in recent years are shown below :

	Cereals (Rice etc.)	Jute	Oilseeds	Puls
1913	100	100	100	100
1924	121	102	144	114
1925	135	154	146	128
1926	139	120	134	149
1928	133	100	142	157
1930	100	63	127	119
1931	78	49	82	89
1932	68	45	76	92
1933	66	41	73	92
1934 (June)	71	36	99	86

The Institution in charge of conciliation can easily find out the principal crop of the land for the purchase of which the debt was incurred. If, however, the debt has been incurred for *ordinary consumption*, the *cost of living index* is to be taken into account. No such series figures are published either for Calcutta or for Bengal and consequently the general wholesale price index has to be taken in working out details. The cost of living index may be taken at an increase of about 15 per cent. over the general price index. Thus, if p is the general price index, $p (1.15/100)$ may be taken as cost of living index. Thus if p_1 and p_2 are the general price indices in the two years as before and x is the amount of debt contracted the real value of the debt should be :

$$x_1 = x \cdot \frac{p_2 (1 + 15/100)}{p_1 (1 + 15/100)} = x \cdot \frac{p_2}{p_1}$$

which comes to the same formula as before, excepting that p_1 and p_2 are wholesale indices and not constituent indices.

If the details about the nature of the debt are not known and some guidance be wanted for an approximate general solution of the problem, we may proceed on the following assumptions :

1. Since the registered debts have generally a currency of 12 years, and as we may assume that very little payment has been made since 1930 which is the first year of depression, we may take 1925, as the average year when the existing debts were contracted.

2. The proportions of debts for purchase of land, etc., and for ordinary consumption may be regarded as 70 to 30 (Bogra).

3. For that portion of the loan incurred for consumption the index number of cost of living (i.e., Index Number of wholesale price) plus 15 p.c. is to be taken.

4. For the portion of the loan incurred for purchase of land, the weighted index of jute (60), rice (30), pulses (5), and oilseeds (5) has to be taken. Those weights have been chosen on the percentage of the value of the export of each commodity to the total value of these commodities. In thus giving weight the assumption is that the *raiyyat* got the wholesale price. This may not be correct as they get considerably less than the wholesale Calcutta price.

5. Finally, to find the required index for 1925, weights have been given to the figures of (3) and (4) in the proportion of 3 is to 7.

For example, the calculation can be made as follows :

• For 1925

Wholesale prices 159
 \therefore cost of living index is $159 + 15$ per cent. of 159 i.e. 182.9

Index price.

Rice	Pulses	Oilseeds	Jute
135	128	146	154
30	5	5	60
<hr/> 4,050	<hr/> 640	<hr/> 730	<hr/> 9,240

Weighted Average is 4,050
 640
 730
 9,240

$$14,660/100 = 146.6$$

183.0	146.5
30	70
<hr/> 5,490	<hr/> 10,255

\therefore the average weighted index of the loan-causing factor is—

$$\frac{5,490}{10,255}$$

$$15,745/100 = 157 \text{ approximately.}$$

Similarly, to calculate the figure for 1934 :

Wholesale price	...	...	...	90
Cost of living index is	90+15 per cent. of	90	...	103.5
Rice—71	Pulses—86	Oilseeds	99	Jute 36

Calculations on the above line give the corresponding index for June, 1934 as about 68.

The existing loans should, therefore, be reduced in the proportion of 157 to 68 or a loan of Rs. 100 should be cut down to one of Rs. 44. The general formula for the above calculation will be as follows :

$$X_1 = X \cdot \left\{ \frac{(69p_1}{(69p_1)^1} + \frac{7(6a_1}{7(6a_1)^1} + \frac{a_2}{a_2^1} + \frac{a_3}{a_3^1} + \frac{12a_4}{12a_4^1}) \right\}.$$

Where X is the loan incurred and X_1 the real value of the loan

p_1 —Wholesale price index

a_1 —Index of rice

a_2 — „ pulse of the year when the loan was contracted.

a_3 — „ oilseeds

a_4 — „ jute

p_1^1 —Wholesale price index

a_1^1 —Index of rice

a_2^1 — „ pulse of the year when the loan is to be repaid.

a_3^1 — „ oilseeds

a_4^1 — „ jute

• FIXING A MINIMUM PRICE LEVEL FOR JUTE

To begin with it is necessary to understand the present position of relative price levels of jute and jute goods.

The index numbers of prices of jute and jute goods during the last few years are shown below :

Year	Raw Jute	Jute goods
1914	100	100
1928	100	150
1929	95	122
1930	63	88
1931	49	76
1932	45	75
1933	41	77
1934 (June)	36	73

It will be seen from the above table that the price of jute has fallen relatively more than that of manufactured jute goods. It is true that during the present depression, the prices of almost all primary goods have fallen more than those of manufactured stuffs due to factors too well-known to require enumeration; but the disproportionate decline in the price of raw jute should be, in the normal course, a bit striking as the fibre is a monopoly product of India and as production since 1930-31 has been moderately curtailed in accordance with the law of demand and supply.

The present position of the industry can be seen from the following calculations :—

The manufacturing cost of hessian varies generally from Rs. 180 to Rs. 220 per ton. It is reported that in some mills like G. Maftlal, Calcutta and Hanuman, the cost is less than even Rs. 180. In the case of Howrah and a few others the cost is Rs. 180. For the Bird-Heilger and Yule groups and also for Bija and Hukumchand, the figure is about Rs. 200 per ton, while in the Inchcape group and in a few others, the cost is the highest and is about Rs. 220 per ton. The average cost may be taken as Rs. 200 per ton, and the figure is not perhaps very far wrong.

The details about the jute used for manufacturing a particular product are not open to the public. For calculation purpose, a mixture of 10 per cent. cut Rejections, 80 per cent. cut L.R. and 10 per cent. cut X.L.R. may be taken for manufacturing hessians. Altogether 28 maunds of jute are required for 4,500 yds. of 9 porter hessians and an average price of as. 4 higher than that of L.R., for the entire raw material is not far from the correct figure. The price of India *Jat*, L.R., is about Rs. 4-6 and so the cost of production is about Rs. 330 and this figure takes into account all charges—depreciation, interest on working capital, etc., and possibly a little of profit too. This cost, thus, comes to a little over Rs. 7 per 100 yds. The selling price of the stuff is about Rs. 8-8 per 100 yds. and so there is a profit of over 21 per cent. in addition to that included in the "cost". It may be assumed that the average profit is about 25 per cent. just at the moment. Last year about this time, the manufacturing profit was easily about 45 per cent.

The profit from the manufacture of heavy goods is much smaller. It is known that recently a certain percentage of sacking looms has been "sealed" and a corresponding percentage of hessian looms has been "opened". There is the restricted production in the Indian Mill Industry (15 per cent. of the looms sealed up) and as there are very few competitors outside India, who can produce coarse jute goods so cheap as the Indian industry, the latter has been able to maintain the prices at a remunerative level.

As stated before the price of L.R. jute is about Rs. 4-6 per maund. With the present price of hessians, even if the price of L.R. jute is Rs. 6 per maund the mills will have a certain margin of profit in this article. In heavy goods, however, the industry cannot bear such price. But still taking all factors into account the price of L.R. jute can easily be Rs. 5-8 to Rs. 5-12 without proving too dear to the industry.

The Calcutta price of L.R. is Rs. 4-6. The freight on the average accounts for about 20 per cent. It may be incidentally mentioned here that although the price of jute and other commodities have recorded sharp declines—in some cases to $\frac{1}{3}$ rd of the pre-depression value—the steamer and railway freight has not materially come down, with the result that the incidence of the freight on the landing cost of jute is disproportionately high. Then, there are intermediaries and middle men and it is doubtful if the grower gets more than Rs. 3 on the average for his jute of the quality mentioned above. It is difficult to say what the actual cost of production of jute is. Wages are not generally taken into account in most cases and consequently it is difficult to arrive at any definite figure. But it may be said that if the grower can get Rs. 5 per maund for his jute, it will be a fairly economic price. If the freight rate can be lowered by reasonable proportion and the profits of the numerous middlemen eliminated by establishing better marketing organisations there is no reason why the *raiya*t should not get this price when 9 porter hessian sells at Rs. 8-6 per 100 yds.

The balers of jute, excepting those who have mofussil purchasing establishments, cannot make any such profit as the mills. When the selling price is compared to the baling cost, it appears that the margin is very small, often nil or on the wrong side. Most of the balers, however, compensate this loss and even make profit by their speculation, based on their baling in the various speculative markets.

The position in jute can be summarised as follows :

The buyers are powerful and well-organised; the growers are illiterate, unorganised and without any holding capacity; marketing organisations are defective at every stage, and there is unbridled speculation and over-trading in the Calcutta markets.

It is imperative that Government should step in to protect the interest of the *raiya*t, and hence of the Province.

We have already discussed elsewhere how the Government can really and effectively help the growers by various measures, including better marketing organisations. Here, we shall restrict our observations to the possibility of fixing a minimum price level for jute.

There are not many instances in the world in the production of primary goods where definite minimum prices are explicitly fixed.

When the ordinary economic laws of supply and demand are interfered with by controlling the supply generally a certain price is aimed at which is to be economic and seldom a definite price is fixed. Such has been the case with tea, rubber, wheat, tin, cotton, coffee, etc.

An analogy with sugarcane does not hold simply because of the fact that the cane deteriorates in sugar value within a short time after harvesting, and it cannot be stocked. The cane must be crushed within 48 hours of cutting. The growers cannot hold out and the factory owners cannot also hold large stocks and dictate their price on growers. It is, therefore, imperative, particularly from the grower's standpoint, that there should be some sort of price fixed for the cane. Naturally, this price should have some definite bearing to the price of sugar. It is, however, still extremely doubtful whether the measure would work properly. Jute is not such a commodity. It can be stocked easily for a couple of years, without any material deterioration of its properties, excepting the colour. There is thus no urgent need for the grower to sell his product immediately after harvesting, if he is not pressed for cash. On the other hand, the consumers also can stock jute for future requirements extending over years.

If minimum price fixation is decided upon, the first essential requirement is, that such price must conform to the general level of prices. If too high a level is attempted at, substitutes are bound to crop up. I have already mentioned elsewhere how the growth of various substitutes are threatening jute even at the present price level. Attention shall have to be paid to the theory of monopoly price in this case. The next point is that it cannot be put at a fixed figure even during one season; unless the minimum price is fixed at too low a level the need for altering it frequently is sure to arise.

Another important point is, what should be the basis for this minimum price? There are two different views on this point. One is that the average cost of production is to be determined first and then a selling price is to be fixed irrespective of other factors, which will leave a margin to the grower. This, however, is not feasible. First of all, it is, as stated before, extremely difficult to say what the actual cost is. Secondly, when the price is "fixed" there will be little incentive for efficient production. Lastly, although the advocates of this system maintain that once the price of jute is fixed, that of jute goods will automatically adjust itself to the price of the raw material, it is quite possible that often the price level of manufactured goods will move independently and that in such cases the minimum price of jute may be either too low or too high. The manufacturers all over the world may combine and keep for a time, by restriction of production, the price of manufactured goods much higher than that justified by the price of raw material. In such a case, the restricted output of the factories will

reduce the demand for raw materials with the result that jute will be sold only at the minimum price and not higher. Others advocate that the minimum price of jute should be fixed periodically with reference to the price of manufactured goods in such a way that the industry would retain a fair and equitable manufacturing profit. This is certainly feasible, although the average manufacturing cost will be difficult to find out. The weighted average of selling prices of different products as well as of their costs are to be taken into account in such cases. Naturally the minimum price is to be changed more frequently than in the other method.

The difficulties of any form of minimum price fixation are, however, obvious.

The first question that will arise is, where will the minimum price be fixed, in Calcutta or in the mofussil? It is too well-known that there are no fixed standards of quality of jute in mofussil markets. In the same locality, jute widely different in quality can be found and, unless there is a minimum price for each grade, there will be obvious difficulty. Assuming that the minimum price of the lowest quality is fixed, higher grade jute will not fetch its just price and it may not be impossible that the output will suffer in quality eventually, growers raising more and more ordinary jute knowing that a fixed price will be obtained for such. This may have a positively adverse effect on the quality of the fibre.

The next point is that to make the minimum price effective the authorities must be prepared to take up jute and hold it whenever offered by the growers at the minimum price. Whether the necessity will arise or not, Government must have organisation all over the Province, even in the remotest parts, if the minimum price is to be made effective, to buy and hold stocks everywhere and must be prepared to invest a couple of crores of rupees in the scheme particularly when the selling pressure of jute is heavy, viz., in September and December. It is quite possible that eventually Government will be able to clear out without loss, even at a profit, but it is extremely doubtful whether they would be prepared to make that elaborate organisation and to find the necessary fund. Difficulties of setting up such an organisation are obvious. Godowns have to be rented, arrangements must be made for insuring the goods stocked and adequate staff, including assorters of jute, etc. must be appointed. It may not be necessary to get everything ready everywhere in the country, but arrangements will be needed so as to make these available when the time comes for action, which must be taken quickly. A corollary to the introduction of a minimum price is the adoption of some kind of restriction of the crop. Government cannot keep open an offer of minimum price unless the growers simultaneously curtail production to the level of the demand. In the absence of any such arrangement, the growers may raise a crop, particularly when they

find other crops not bringing remunerative price, much in excess of the requirements of the consumers, knowing full well that their jute will bring them at least a minimum sum. Government may, therefore, be required to take delivery of a large quantity of jute unless simultaneously there is the restriction of the crop. Naturally, this will be compulsory restriction and not voluntary, as the Government cannot take the risk of failure of a voluntary measure, although we are not prepared to admit that everything necessary has been done to give the voluntary scheme a chance. Particularly nothing has been done, in our opinion, to show the grower what substitute crop can be raised in the land released from jute. We have already shown how jute can be replaced in certain districts in Central and North-Western Bengal by oil-seeds, specially linseed, in Midnapur, and certain tracts of Dacca and Mymensing by groundnut, in Faridpur, Dacca, and other places by hemp, in Dinajpur, Rajshahi, Faridpur, Dacca and by sugarcane in Rajshahi and so on.

If the agriculturists are shown what crop to substitute in the released land and are given encouragement and facilities it is quite possible that the voluntary measure will attain the necessary amount of success. This has not been done as yet, and so no verdict against the voluntary measure is justified at this stage.

Compulsory restriction will be difficult to enforce and is fraught with dangerous possibilities in a country where the producers number millions distributed over practically a whole province and where the holdings are small. A very efficient controlling agency will be needed for the purpose and such organisations will undoubtedly be costly. Further, as yet the Government have not the machinery necessary for forecasting the quantity of jute that may be needed in a particular year and to handle the problem as a whole. The practical difficulties of compulsory restriction are almost insuperable in the present state of the country. And price fixing without regulation of the crop is impossible. In U. S. A. the two measures (the restriction is voluntary and Government is paying the agriculturists compensation for withdrawing the crop) are being simultaneously tried for cotton.

We are definitely of opinion that an immense change for the better is possible if a voluntary regulation of the crop is properly attempted under the guidance of a Jute Board or such other organisation and simultaneous improvements in the marketing organisation and in the holding capacity of the growers be effected.

A Scheme for Improving the Jute Trade.

The problem for jute is two-fold, at the present moment, as has been stated in the Recovery Plan. They are :

1. Improving the production side
2. Improving the marketing organisation.

In (1) again, there are two clear sub-divisions :

- (a) Improvement in production, viz., lowering the cost and producing better jute,
- (b) Regulation of the crop according to the world demand.

Similarly in (2) there are four distinct problems :

- (a) Marketing of jute in mofussil
- (b) Marketing of jute in Calcutta
- (c) Marketing of jute in foreign countries
- (d) Making new uses for jute.

1 (a). As has been stated in the Recovery Plan, jute is the best sacking and packing raw material, provided it is cheap. Already there is competition in the field from substitutes, both natural and artificial. The price in the world's market and hence the cost of production must be kept low. This should naturally be done by increasing the yield per acre. As the demand for the fibre is limited, increased output per acre will lower the cost of production and at the same time release land now under jute for other crops.

The normal outturn of jute per acre, as accepted by the Government, for different regions are shown below :—

Dacca and Chittagong Divisions	...	3.7 bales (400 lbs.)
Rajshahi Division	...	3.5 Do.
Presidency and Burdwan Divisions	...	3.2 Do.
Behar and Orissa	...	3.3 Do.
Assam	...	3.5 Do.

• It is obvious from the above figures that so far as Bengal is concerned, the cultivation of jute should be concentrated, as far as possible, in Dacca, Chittagong, and Rajshahi divisions. Of course, entire suspension of jute cultivation in the other two divisions is not possible as the Presidency division produces *Dessi* jute for which there is a special demand.

Jute ordinarily does not require much manure. Still experiments should be made to see to what extent the different types of manures increase the production. A soil survey must be undertaken without delay. Both these works can be entrusted to the Agriculture Department.

The increase in the output is to be achieved principally by improved seeds. The *Kakya Bombai* has already proved to be a success. It gives about 160 lbs. more of jute per acre than the local varieties. Other types are being experimented with which may give 50 lbs. more than even the *Kakya Bombai*. The importance of these improved types can be gauged from the fact that increase in output from their use is about 15 per cent. and a corresponding area can be released for other crops in the districts where these are introduced, particularly of the Dacca Division where the acreage under jute is the largest.

As for the varieties of jute, the cultivation of the *Deshal* of Behar, *Charua* and *Jungli* of Assam and the particular type intermediate between *Dessi* and *Tossa*, produced in Western and North-Western Bengal can be stopped altogether, as these are of inferior quality and serve no particular purpose. Even the *Dessi* crop in the Presidency division can be reduced. Of late the consumption of this variety by Indian mills has decreased. Dundee is the only important buyer of this quality and the tendency there also is to reduce the offtake. The *Jat jute*, having the best fibre, should be introduced wherever possible.

The Agricultural Department should continue to carry on the research work in connection with the seeds.

It is also desirable that a small laboratory should be fitted up to test the physical and chemical properties of the fibre. Jute is being increasingly used for higher classes of textiles, where it is submitted to various treatments, physical and chemical, and so efforts should be directed to find out and, if necessary, to improve particular properties needed for special purposes.

1 (b). The most important problem in jute to-day is the regulation of supply according to demand.

The average consumption of jute is 90 lacs bales per annum (50 lacs by the Indian mills and 40 lacs by foreign consumers). The normal aimed production should be at the figure, but in the next few years the available supply should be less as the consumers, particularly the Indian mills, carry large stocks, sometimes for over a year, and can thereby depress prices by remaining out of the market for a considerable period. It will be better if in the next season the crop can be reduced to 60 lacs of bales (so that the stocks of the mills may be reduced by 30 lacs of bales, a reasonable reduction, the mills requiring a moderate stock in these days of forward transactions, also for hatching). But possibly the change will be too drastic and so the total reduction may be spread over two, if not three years. It is known that the Government's figure for the outturn per acre is an under-estimate. In Eastern Bengal districts, with improved varieties of seeds, the yield per acre may be easily 4 bales. For 75 lacs of bales of jute, an acreage of 19 to 20 lacs ought to be sufficient. The aim of the Governments should be to have jute sown in 19 lacs acres in the next two years. The area under jute, this year is about 25 lacs acres, and of this about 88 per cent. is in Bengal. Bengal's share in the reduction should be slightly over 5 lacs, and arrangements must be made to curtail the existing acreage by this amount, say, roughly 5 lacs acres.

It has been shown in the Recovery Plan that price fixing and compulsory restriction are extremely difficult, if not impossible and that

voluntary restriction has not been given a fair trial here. We have already shown how the voluntary restriction plan would be operated. To recapitulate in brief : Districts are to be selected, keeping in view the quality of jute grown there and possibility of substitute crops to be grown and the acreage to be withdrawn therefrom is to be fixed. The *raiyats* in these regions are to be told that if they do not sow jute they will be given Rs. 15 per acre and also all facilities will be given to them to grow substitute crops. The acreage in other districts should not be allowed to increase. Government, through Union Boards and other agencies, are to prepare a list of the *raiyats* growing jute, showing against their names the acreage under the crop.

The same procedure must be followed in Bihar and Orissa and Assam, as well as in the Native States.

A tentative proposal scheme follows :

District.	Acreage that may be withdrawn 000 acres.		Substitute crop suggested.
Nadia	30	Sugarcane, Rapeseed, Linseed.
Jessore	20	Ditto.
Murshidabad	10	Cotton and orcharding.
24 Parganas	20	Sugarcane, oilseeds, rice.
Rajshahi	50	Sugarcane, linseed.
Rangpur	50	Tobacco.
Dinajpur	50	Rice, sugarcane.
Tipperah	20	Sugarcane, cotton.
Dacca	100	Sugarcane, oilseeds, hemp, cotton
Mymensingh	100	Rice, cotton, oilseeds.
Faridpur	50	Rice, sugarcane, hemp seed.
Backargunj	30	Rice, sugarcane.
Hooghly	20	Ditto.

550

A reduction of about 5 lacs acres will do for Bengal. Bihar and Orissa and Assam should reduce the acreage by about 70,000 acres.

As a result of the Ottawa Agreement Indian linseed is in great demand in Great Britain; rice is also fetching good price; in fact even with the large fall in price, rice, according to the report of the Imperial Council of Agricultural Research, is the most lucrative crop. Further, Bengal is deficient in her supply of rice relative to the demand. Properly assorted and cleansed Indian hemp is also in great demand not only in Great Britain but all over Europe.

The work involved in the above scheme consists of :

(1) Preparing as accurately as possible, a list of areas under jute crop with the names of the *raiyats*.

(2) Preparing a list of the substitute crops for each district and keeping in stock seeds, etc., of such crops. Item No. 1 can be entrusted to the circle officers and other Government agencies and No. 2 to the Agriculture Department. .

Assuming a reduction of 5·7 lacs acres (5 lacs in Bengal and 0·7 lacs in Bihar and Orissa and Assam) the subsidy needed will be about Rs. 85 lacs. It may be necessary to slightly vary the amount per acre according to the district; for example, in districts like Dacca and Mymensingh, Tipperah, Faridpur and a few others, the output of Jute per acre is higher than in other districts, and if thought necessary, the *raiyats* may be given a little more than in other districts. But in any case the subsidy should not be more than Rs. 85 lacs.

If it is thought that simultaneously so many districts may be difficult to tackle, work may be concentrated on 4 or 5 big jute producing districts like Mymensingh, Dacca, Rangpur, Tipperah and Faridpur, but, apart from the great pressure on the officials of these districts, there will be another defect, viz., inferior jute will continue to be grown while the cultivation of superior jute will be curtailed. ,

The amount necessary for the subsidy can be raised by :

(1) Consumption tax

(2) Tax on jute exported.

The levy is to be Re. 1 per bale. This is not going to be a heavy tax. It can be reasonably expected that the price of jute, as the result of the restriction scheme, will rise to about Rs. 5·8 to Rs. 6 per maund in Calcutta and so a levy of slightly over As. 3 per maund will not cause any inconvenience to any party. The mills will not grudge this, as their stocks will appreciate in value; in all probability, the incidence of the levy will eventually fall on the growers but as their crop will fetch higher value, they also will not grudge.

The tax will fetch about :

Rs. 50 lacs from the mills
Rs. 40 „ „ „ shippers

Total Rs. 90 lacs

during the next twoⁿ years. It is understood that the tax on exports will be in addition to the jute export duty. For the first two years the subsidy required will be about Rs. 85 lacs per annum, and so there will be a surplus of about Rs. 5 lacs per year. The way in which this sum is to be utilised will be stated hereafter.

After the first two years, the acreage can be steadily increased till it reaches the 25 lacs acre level—the acreage at present. In such a case, the levy can be reduced progressively till it is about As. 2 per bale, which will give an yield of about Rs. 11 lacs. If, however, at any time there is need for restricting the acreage again, the levy may be proportionately increased. The tax on exports may be collected through the Customs Department, and the consumption tax through the Income Tax Department or through the Municipalities in which the Mills work.

2 (a). The remedies have been suggested in the "Recovery Plan". To recapitulate, these are :

(i) fixing of standards and the introduction of uniform weights and measures throughout the Province. Standards can be fixed in consultation with the trade, and uniform weights and measures through executive measures.

(ii) Establishment of regulated markets; the subject has been discussed at length in the Jute Enquiry Committee's Report as well as in our book. These should be self-supporting.

(iii) Establishment of licensed warehouses and arrangement for credit facilities from the Banks.

(iv) Establishment of Co-operative Jute Sale Societies.

2 (b). Marketing of jute in Calcutta.

(i) In the case of loose jute, the following are the principal points :

Freight rates, specially the steamer rates from Eastern Bengal, are to be lowered, and insurance facilities to be extended to country-boat transport.

Storing facilities are to be provided in the Cossipore Mart.

(ii) In the case of pucca bales, the existing futures markets should be thoroughly overhauled. In our opinion a Futures Market with loose jute as basis should be established. With standards fixed, there should not be any difficulty in having loose jute as the basis for hedging.

The "Home Guarantee" clause in the export trade is difficult to justify on principle. A system of certifying the quality from this side, as is being done in the case of Manila hemp in the Philippines should be introduced. The subject has been discussed in this book.

2 (c). There should be special representatives in the principal foreign countries for propaganda for more extensive use of jute and also for keeping India informed about the improvement in the technics and new uses of the fibre.

2 (d). Development of Jute Cottage Industries. This should be left to the Industries Department.

For solving the above-mentioned problems, a Statutory Jute Board should be formed. There should be 3 members from Bengal, one acquainted with agriculture, another with finance and the third (who is to be the Chairman) with the trade. Bihar and Orissa and Assam will send one member each. All the members must be salaried. The chairman will get Rs. 2,000 per month and members Rs. 1,500 each per month. The salaries of the Bihar and Orissa and Assam members are to be borne by their respective Governments. The Secretary of the Board shall have a graded salary of Rs. 750-50-1,000. Total salary would be Rs. 69,000 per annum for the Board.

The Board should be under the Ministry of Agriculture and Industries, but must be entirely independent of any other department under the Ministry. A Sub-committee of the Board of Economic Enquiry, with option to co-opt members from outside, shall be the advisory committee to the Jute Board. The duties of the Board shall be :

(1) To work out the details for regulating the crop their decisions are to be final in the matter and are to be enforced through the Agricultural Department and general administration departments. It will be also responsible for forecasts and crop reports.

(2) With the co-operation of the Agricultural Department it will recommend the substitute crops.

(3) With the co-operation of the trade it will fix the standards.

(4) It will organise and control the "regulated markets."

(5) Although licensed warehouses are to be established all over the country for various crops, the Board will consider the case when these are needed for jute alone. In such cases, it will arrange for the establishment of such warehouses by private agencies, guaranteeing, if necessary, a certain rate of interest on the capital invested and supervising their working when such assistance is granted.

(6) It will, as in (5), arrange for storage facilities in Cossipore Mart.

(7) It will assist in the formation of Co-operative Jute Sale Societies.

(8) It will control the future markets.

(9) If the system of certification of the grade for exports be adopted, instead of the present Home Guarantee, the Board will be put in charge of this business. In such case, the Board shall charge 3 pies per bale for this work. It should be mentioned here that the introduction of the system of certification is not going to be an easy task. The foreign consumers are sure to resist this innovation and perhaps with justice in many cases, as the foreign consumers very often require special qualities of fibre and even special 'marks' for their particular use.

(10) It will engage special representatives in foreign countries for propaganda and for the collection of detailed information regarding the consumption.

Apart from the members of the Board and the Secretary, the following Officers will be needed :—

			Rs.
(i) Liaison officers with the Agricultural, Co-operative and Industries departments	...	2	(300-25-500)
(ii) Officers in charge of regulated markets	...	20	(200-20-400)
(iii) Officer for supervision of storage facilities, licensed warehouses and futures markets	...	1	(300-25-500)
(iv) Officers for certification	...	2	(200-20-400)
(v) Officers in foreign countries, one in Hamburg or Antwerp and the other at Genoa	...	2	(800-50-1,000)
Total salary of all appointments to be made—Rs. 82,800.			

Office staff and other charges in the Head Office :

			Rs.
Head clerk	...	1	100-5-150
Clerks	...	4	50-3-80
Typists	...	2	40-2-60
Bearerers	...	4	15-½-20
Stationery, etc.	...		500 per annum
Telephone, Postage,			
Printing, etc.	...		1,000 per annum
House rent is not included.			

			Rs.
Total office staff, etc.	...	...	6,780
Peons with officers under (2), (3) and (4)—23	...	...	4,140
Travelling Allowance	...	...	5,000
Office establishment for officers in (5) at Rs. 500 per month each	...	...	12,000
Travelling Allowance of officers under (1)	...	...	5,000
Provision for miscellaneous and unforeseen charges including those in connection with guarantee, etc.	...	...	20,000
Total			52,920

Total cost of the scheme :

			Rs.
A. Salary of the Members and Secretary of the Board	...	...	69,000
B. Salary of officers	...	...	82,800
C. Establishment and miscellaneous	...	...	52,920
Or roughly total about Rs. 2,05,000			
Capital expenditure	...	Rs.	25,000

During the first two years, assuming that certificate system in exports possible, the account will be as follows :

RECEIPTS	EXPENDITURE
Rs.	Rs.
Consumption and export tax at the rate of " Re. 1 per bale ... 90,00,000 Certificate tax at 3 pies per bale ... 62,500	Subsidy to 570,000 acres at Rs. 15 per acre ... 85,50,000 " " Cost of the scheme ... 2,05,000
90,62,500	87,55,000

In all probability, the certificate system will not be possible to introduce shortly; still, there will be a surplus of about Rs. 2,50,000 per annum during the first two years. This amount can be utilised to organise the Jute Co-operative Sale Societies. It is quite possible that if run on proper lines, these organisations will not require any assistance after the first two years.

If nothing catastrophic happens in the meantime and there be no further development in the direction of aggressive economic nationalism, after a couple of years increase of the acreage to the present day level may be possible. But, if the output per acre increases, it may be necessary to keep the acreage curtailed. In all such cases, the Board will do the needful regarding regulation. Assuming that the present day acreage may be restored there will be no need for subsidy but the Board will continue to function and do practically all the duties mentioned above. Under such circumstances the consumption tax may be levied at the rate of As. 2 per bale and even less. There will still be a surplus in the budget of the Board and such surplus may be utilised in building up a special Research Bureau for Jute. At 1 anna per bale tax, the revenue of the Board will be over Rs. 5,60,000. Even allowing further increment in the salary and charges for increased commitments, the Board will have a large surplus for expanding its activities.

"POWER" FOR INDUSTRIES

One of the essential conditions for the success of industries is the supply of cheap power. Every country bent on industrialisation tries to ensure a supply of cheap power for the industries; and in most cases water-power which, otherwise, runs to waste is utilised to generate electricity. In her 5-Year Plan France means to supply her countryside completely with electric power from hydro-electric plants. The satisfactory position of the large-scale industries of Norway, despite the general trade depression that has overtaken the world, is attributed to the cheapness of Norwegian water-power. In India, too, attention is now being paid to generate electricity from hydro-electric power installation as will be evident from the fact that the Mettur irrigation system which was inaugurated on the 21st August, 1934, is to have it as a part of the system. The Hydro-Electric installation will develop a maximum capacity of 49,000 horse-power and its cost has been estimated at 180 lakhs of rupees. In an address to the Institute of Metals in 1931 Mr. W. B. Woodhouse, former President of the Institution of Electrical Engineers stressed the importance of hydro-electric schemes and indicated the possibility of prices as low as 0.15d a unit in certain circumstances.

The necessity of Hydro-Electric Survey of Bengal with a view to investigate and determine suitable sites for generating power cannot be over-emphasised, as without cheap power industrial expansion cannot be possible. Electric power can be used not only for lighting, heating and running railway trains and tramcars but also for running various kinds of mills and factories such as oil mills, saw mills, paper mills, textile mills, sugar factories, etc. In the tea garden, for instance, both the motive power and the hot air for drying operations can be obtained electrically. The cotton mills of Bombay are now mostly driven by electric motors, the power being supplied from the Tata scheme. Electro-metallurgy and electro-chemistry have rendered it possible to handle materials not workable by any other means. In an agricultural country like India the production of artificial fertilizers by the help of electricity is of special interest. The following is quoted from the preliminary report of the British Water Power Committee :

"Production of artificial fertilizers—Nitrogen fixation :—In the utilisation of atmospheric Nitrogen for the production of Nitric acid and the manufacture of nitrates, great developments have taken place during the last decade and in Norway alone over 4,000,000 electric horse power is now absorbed in its production. The world's annual consumption of nitrogen in its various combinations is about 750,000 tons representing a value of £50,000,000 and this demand is increasing yearly. Four-fifths of this supply has been produced hitherto from natural nitrate deposits, but in view of the rapid depletion of these deposits and in the diminution

of fertility of most of the great wheat and cotton growing areas of the world the production of artificial fertilizers by one or other system of nitrogen fixation must in the near future become a question of national importance".

But however alluring the prospects of hydro-electric power may be, it must not be taken that it can be profitably utilised in all places and in all circumstances. Mr. J. W. Meares, late Chief Engineer of the Hydro-Electric Survey of India, rightly remarked in his Preliminary Reports of the Water Power Resources of India that the "commercial possibilities of hydro-electric scheme depend on two factors, viz. the capital cost of the scheme on the one hand and the cost of the competing fuel on the other. Comparing a steam or oil-driven electric plant with one water-driven, the latter is almost invariably much more expensive to construct and all it saves is the cost of fuel which is only one factor in the cost of generating power. Staff and stores, office and legal expenses, repairs and depreciation are incurred in both. Thus while the actual comparison will be between the prices at which electricity can be sold in both cases the real criterion of success is whether the capital charges for interest and depreciation or the excess cost of the water-power undertaking will be substantially less than the cost of the fuel used by the other". There is yet another point which requires consideration. In the case of the hydro-electric power the total cost of running does not depend to any appreciable extent, on whether the plant is fully or only lightly loaded; it is practically a fixed sum per annum so that the cost per unit is, so to say, proportional to the total number of units generated. This is not so with fuel consuming stations. Every extra unit generated in a fuel consuming station involves the consumption of a definite amount of fuel and so a definite cost. The use of hydro-electric power, therefore, will be of advantage only when it will be possible to utilise the whole plant to almost its utmost capacity throughout the year. Not only the cost of coal but also the load factor of the plant (*i.e.* in non-technical language the ratio of its actual to its possible output) is of immense importance and the advantages of hydro-electric power increase as the load factor rises to its ideal limit. So for a proper hydro-electric survey of the Province it is not only necessary to select sites for the generation of power but there are other important factors which have to be taken into consideration such as the cost of fuel in the surrounding places and what industries can be profitably started in the locality to keep the power plant fully engaged throughout the year, as also the freight of the raw material to the site and of the finished product to the market.

The Hydro-Electric Survey was initiated by the Government of India before the Montagu-Chelmsford Reform Scheme was inaugurated and in the *Report on the Water Power Resources of India* it was mentioned

that hydro-electric developments were possible in several districts in Bengal—chiefly in Chittagong, Darjeeling, the Duars and Sikkim. Detailed investigation was not undertaken by the Central Government and it was subsequently ordered in Government of India (P. W. D.) letter No. 530-A.G., dated the 27th October, 1920, that “all outlays on water storage and water-power will be a provincial charge and the necessary provision for hydro-electric survey should, therefore, be made in the provincial estimates from and after 1921-22”. Accordingly the Local Government appointed a Committee in 1921 to consider what measures should be taken to conduct and control the work of Hydro-electric Survey of Bengal.

This Committee was directed in the first instance to confine its attention to the Hill Tippera area round Comilla and Chittagong. The deliberations of the Committee were chiefly confined to the consideration of the information supplied by Mr. O. Grieve, Engineer, who had been temporarily appointed to make local investigations. It was decided to conduct surveys to collect data in respect of the quantity of water available for power purposes in the Karnaphuli river in the Chittagong Hill tracts. The Committee arrived at the conclusion that the Karnaphuli was entirely unsuitable for the supply of power for commercial purposes. Investigations were not undertaken to ascertain if there were other places in the Chittagong site where hydro-electric developments are possible, and Darjeeling and the Duars still remain unexplored. There is one hydro-electric station at Darjeeling, but the present plant is not capable of supplying the whole district with power. In the Duars, Mr. Meares has remarked “in addition to Jaldaka on the border there are to the east some half a dozen large rivers, mostly snow-fed, falling into the Duars and Goalpara from Bhutan. The Amochu or Torsa, the Chiachu of Raidak, the Sankash, the Saralbhanga, Manas as well as smaller streams all come from very high ground and must have great possibilities; but no maps are available and no prospecting has been done”. The Bhutan authorities have always opposed the development of the resources of the country from outside, and this obstructive attitude has to be overcome by persuasion and negotiation. It is worth noting here that two Calcutta firms, Messrs. Burn & Co. and Messrs. Octavius Steel & Co. investigated, under concession, the possibilities of the Teesta and the Jaldaka rivers; but no practical results have ensued.

In order to work out a detailed scheme with a carefully calculated estimate of cost for the supply of electric power, it would be necessary to employ a trained and experienced engineer with a thorough knowledge of mechanical electrical engineering and it is a task which Government alone can undertake. After particulars of the various possible water-power sites have been ascertained and published it would be for private enterprise to take necessary steps.

The possibility of developing a hydro-electric system for Chittagong may be further examined. The Committee which dealt with this matter may not have been aware that there are as many as 29,150 looms working in only one district in the Hill Tracts and if cheap power is made available it may not be difficult to introduce electric drive of looms in time provided arrangements for the preparatory processes connected with weaving, actually exist. The Committee which investigated the possibilities of generating hydro-electric power in the Chittagong Hill Tracts apprehended that the amount of power that would be generated would not be fully utilised. But the modern trend in advanced countries is to find the power and then establish industries to utilise it. There is no reason why, given reasonably cheap power, new industrial areas should not arise near the source of power. Power, moreover, can be transmitted to a long distance. In America it is not unusual to find it transmitted over distances of 250 miles and upwards.

But the problem is not free from technical difficulties the solution of which must depend on careful investigation. The necessity, urgency and importance of such investigation cannot be over-emphasised as the development of industries depends, to a considerable extent, on the supply of cheap power.

From what has been said above it will become apparent that sources of the supply of hydro-electric power cannot be tapped at once. What is to be done in the meantime? Time presses and the successful solution of the problem of our industrial development will not brook delay. Work, therefore, must be begun with oil-engines.

Various kinds and types of oil-engines are now available and are generally within the reach of investors in small industries. The fuel used is ordinary crude or kerosene oil. They are not difficult to set up nor to handle. The only obstacle that stands in the way of their being in universal use is want of facilities in the mofussil to repair them when necessary. To obviate this difficulty small, but well-equipped workshops with trained mechanics should be attached to the Sub-division Stores of which we have spoken before. Where local Stores are sufficiently important, i.e., in busy centres of any industry, it may also be possible to equip workshops connected with these Stores.

By arrangement with the Stores, manufacturers of oil-engines or their agents may be ready to supply the engines on the easy payment system thus making it possible for small factories to secure them.

When these engines are used the Stores would find it profitable to advise the users to use one type of engine in the locality so that spare parts may be stocked for purposes of replacement.

Needless to say the Stores would stock oil fuel.

AGRICULTURAL FINANCE

In the chapter on Agricultural Finance we stated that we would present a model constitution for credit banks. On subsequent consideration we have arrived at the conclusion that it would be unnecessary to give a model constitution at the present stage. We have pointed out the nature of such banks in other countries which would be sufficient to provoke the thought of the public and enthrall their attention to the need of such institutions. When public opinion will become consolidated and crystallised then will be time to place before the country a draft constitution truly representative of the nature of wants and of the desire of the people. Besides, the intermediate banks will cover the margin between the spheres of work of the co-operative bank at the one end and the land mortgage bank at the other. Unless and until the spheres and scope of work of these two kinds of bank have been properly decided upon and shaped it will not be possible to gauge accurately the margin in which the intermediate banks should work. This is the vital difficulty which is at present facing us. But we fervently believe that when the difficulties mentioned have been removed it will become easy to present a draft constitution.

JUTE

In the third chapter of the book we have said that the cultivation of jute should be based on voluntary restriction. In the appendix we have developed a scheme of voluntary restriction based on subsidy. Just before the publication of this book the Government of Bengal have come forward with a scheme restricting the cultivation of jute on a voluntary basis. It is quite likely that as a result of the operation of the Government scheme the area under jute will decrease. But if by any chance the Government scheme fails to ensure a reduction in acreage the only possible and feasible method of reducing the acreage will be by the adoption of the subsidy scheme adumbrated by us.

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